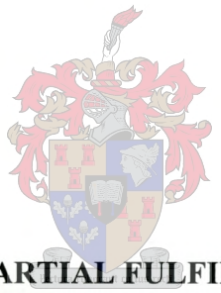
AN ASSESSMENT OF READINESS FOR SELF-DIRECTED LEARNING OF DIPLOMA STUDENTS IN A SOUTH AFRICAN TECHNIKON

LUCKY NR CHIPEYA



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SUPERVISOR: PROF CA KAPP

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DECLARATION

I, THE UNDERSIGNED, DECLARE THAT THE WORK CONTAINED IN THIS THESIS IS MY OWN ORIGINAL WORK AND HAS NOT PREVIOUSLY IN ITS ENTIRETY OR IN PART BEEN SUBMITTED AT ANY UNIVERSITY FOR A DEGREE.

SUMMARY

Self-directed learning is a teaching and learning strategy considered important in fostering lifelong learning. Students take responsibility for their own learning with or without the help of others. It is expected of higher education institutions to prepare students for the dynamic world of work so that graduates are multi-skilled individuals capable of working and the same time be lifelong learners.

The aim of this study was to assess the readiness to engage in self-directed learning of radiography diploma students at the Technikon Witwatersrand. Assessing the students' readiness to engage in self-directed learning is the first step in the planning and implementation of self-directed learning.

The Self-Directed Learning Readiness Scale was the instrument used to assess the students' readiness to engage in self-directed learning. The instrument is widely used to assess students' perceived attitudes towards self-directed learning. The scale was administered to a total of 133 students registered for the National Diploma Radiography: Diagnostics at the Technikon Witwatersrand in the year 2003. Of the 133 students, 51, 36 and 46 were in first, second and third year respectively.

Data analysis revealed that the first year students' mean score on self-directed learning readiness was relatively higher than those of second and third year students. Assessment practices and prior exposures to self-directed teaching principles were identified as factors that had an influence on how the students perceived themselves to be ready to be self-directed.

Results obtained from this study provide valuable information for the Department of Radiography at the Technikon Witwatersrand and any other institution in the preparation, implementation and conceptualization of self-directed learning as a teaching and learning strategy.

Recommendations were that lecturers should assume self-directed learning approaches to the first year students from the onset while gradually introducing self-directed learning strategies to the second and third year students.

OPSOMMING

Selfgerigte leer is noodsaaklik om 'n klimaat van lewenslange selfontwikkeling te bevorder. Hierdie leerstrategie verplig leerders om verantwoordelikheid vir hul eie vordering te aanvaar, met beperkte hulp van ander. Daar is 'n verwagting dat Hoër Onderwys studente sal voorberei om hul plek vol te staan in dinamiese werkstituasies. Daar word ook van gekwalifiseerde beroepslui verwag om op verskeie terreine 'n bydrae te maak tot hul gekose beroep en hulself lewenslank te ontwikkel.

Die doel van hierdie studie was om die diplomastudente in Radiografie by Technikon Witwatersrand se gereedheid tot selfgerigte leer te evalueer. Hierdie evaluering word algemeen beskou as die eerste stap in die beplanning en implementering van so 'n leerstrategie.

Die Gereedheidskaal vir Selfgerigte Leer (Self-directed Learning Readiness Scale) is gebruik om die studente se houding teenoor hierdie onderrigmetode te evalueer. Altesaam 133 geregistreerde Radiografie studente het aan die navorsing deelgeneem. Van die 133, was 51 eerstejaar-, 36 in hul tweedejaar- en 46 finalejaarstudente.

Data analise het getoon dat die eerstejaars 'n hoër graad van gereedheid getoon het vir selfgerigte leer as die tweede- en derdejaars. Die toepassing van bepaalde beginsels van evaluerings en vorige blootstelling aan hierdie leermetode is geïndentifiseer as faktore wat tot hierdie resultaat gelei het.

Die resultate van hierdie navorsing het die Radiografiedepartement aan die Technikon Witwatersrand van waardevolle inligting voorsien in die beplanning, implementering en konseptualisering van selfgerigte leer.

Daar word aanbeveel dat dosente 'n selfrigtinggewende benadering met eerstejaarstudente moet volg, terwyl die selfgerigte leerbenadering geleidelik in die tweede en derde studiejare ingefaseer word.

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Lastly, I would like to dedicate this thesis to my late sister Lassie Mbokazi, for encouraging me to register for this degree but could not live long enough to see the end of it.

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LIST OF ABBREVIATIONS

CPD	**Continuing Professional Development**
DR	**Diagnostics Radiographer**
HE	**Higher Education**
NMR	**Nuclear Medicine Radiographer**
OBE	**Outcomes Based Education**
SAQA	**South African Qualifications Authority**
SDL	**Self-Directed Learning**
SDLRS	**Self-Directed Learning Readiness Scale**
SPSS	**Statistical Package for Social Sciences**
RTR	**Radiotherapy Radiographer**
TWR	**Technikon Witwatersrand**
USR	**Ultrasound Radiographer**

CHAPTER 1

INTRODUCTION AND OVERVIEW

1.1 BACKGROUND AND ORIENTATION

At the center of the modern social organization whether it is a business, an educational institution or an organ of government is found, increasingly, an individual who is expected to be self-efficacious, self-directed, self-motivated, flexible, multi-skilled and generally multi-talented. Educators and educational institutions are expecting of their learners that they become like these multitalented individuals. Office and work technology is also being developed on the assumption that users are people who are motivated towards being learning individuals. These learning individuals are expected to be conscious and in control of their own learning that is self-directed.

In recent years considerable attention has been paid to the quality of teaching and learning in higher education (HE). Improving the quality of teaching and student learning is a challenge for HE institutions. There is generally a growing awareness of the necessity to change and improve the preparation of students for the dynamic world of work. "Teaching effectiveness" and "learning quality" are the buzzwords in places of higher learning in keeping with the expanded student educational needs in preparation for the ever-changing student profiles and the demands of the workplace.

According to Taylor, and Burgess (1995:1) self-directed learning is assuming a more central place in higher education. Universities, technikons, colleges and other HE institutions are, more than ever, taking a more active role in ensuring that the graduates they produce can readily transcend from being students to lifelong learning professionals. Fischer and Scharff (1998:2) advocate that lifelong learning has emerged as one of the major challenges for the worldwide knowledge of the future. Many universities are now placing specific emphasis on the development of self-directed learning or lifelong learning skills as one of the primary goals of a university education (Price, 2000:1). The mission statements and goals of a number of universities and technikons, and many other institutions of HE, explicitly endorse the adoption of lifelong learning. It is, therefore, important for HE institutions to empower students to participate in their own learning as an intended outcome of lifelong learning.

According to Hiemstra (1994:81b), the knowledge that most adult learners desire to assume considerable responsibility towards their own learning, has resulted in notions about empowering learners to take personal ownership of their learning. However, educators need to be able to assess a student's readiness to be self-directed, and guide them from dependence to independence if not ready (Seabrook, 2000).

This study was about a key characteristic expected of the modern day individual, a self-directed learner, with specific reference to the National Diploma Radiography: Diagnostics student at the Technikon Witwatersrand (TWR). The diagnostic radiographer is a health care individual that operates and takes care of sophisticated and expensive machines (x-ray machines) that are mostly computer based. Further, with some of these sophisticated and expensive machines (Computer Tomography or Magnetic Resonance Imaging) this individual in some instances creates two or three-dimensional images of the human body. Diagnostic radiography is a dynamic profession that continually changes mostly in the area of the x-ray machines. According to the Port Elizabeth Technikon's website, new technology develops very rapidly in the field of radiography and a large range of newer equipment now utilizes computers. As the diagnostic radiographer operates these sophisticated and expensive machines, special attention is paid to anatomy, physiology, pathology and the well being of patients. Therefore diagnostic radiographers are among modern day professionals who are expected to be self-motivated, self-directed and self-efficacious and be able to accept responsibility of own actions and some of the professional demands.

Ropp (2000) maintains that, the need for self-directed learning is additionally impacted upon by the knowledge that networked computers (most x-ray machines are computerized) have particular affordances and constraints. Most of technological interfaces assume interactions with a single individual who controls the mouse, keyboard and menu selections or commands (the diagnostic radiographer is involved also controls the mouse, keyboard and menu selections or commands when imaging patients). Learning to work with such individualistic interfaces typically requires hands-on experience and most learners will work alone for the majority of these experiences over the course of their years of learning, and in the years to follow. Ropp (2000) asserts that this kind of environment assumes that a learner, who knows how to be self-directed and independent, will be more successful than the one who is dependent on structured guidance. It is therefore essential that the diagnostic

radiographer is able to continually learn in keeping with the advancement in radiography technology as well as the changes in patients' profiles.

1.2 BACKGROUND TO THE PROBLEM

The TWR is a major trainer of diagnostic radiographers for the country's health care industry. Diagnostic radiographers are key personnel in health care institutions whose functions are at the core of the x-ray process. They make use of x-rays in producing images that assist radiologists in the diagnosis of disease. X-rays pass through tissue to examine bones, cavities, organs and foreign objects.

The challenge faced by educational institutions such as TWR, is how to motivate and encourage its learners and educators to engage in teaching and learning activities that centralise self-directedness. At the core of this challenge is the researcher's belief that the teaching and learning strategies for diagnostic student radiographers at the TWR has to be restructured and reoriented so as to encourage self-directedness. In addition, these students should be encouraged to see themselves not as passive empty vessels waiting to be filled with knowledge, but rather as active and self-motivated seekers of knowledge. Learners need to see the development of their professional status primarily as their own responsibility, and the TWR needs to teach in such a way that their learners have confidence in themselves as self-directed individuals.

Currently, the programme is offered predominantly through the instructive approach to teaching and learning. In this approach the teacher is viewed as the source of knowledge where students are considered passive receptors of knowledge. Instructive teaching and learning strategies rely more heavily on lectures and adherence to content rather than first hand sources of data and manipulative materials. At the TWR, the instruction of diagnostic student radiographers is done mainly via the lecture method followed by tutorials in small groups where applicable.

The diagnostic radiography student is taught technical skills (operation and care of different types of x-ray machines and patient positioning for different parts of the body under investigation), anatomy, physiology, pathology, physics, patient care and departmental management. Practical and theory components are integrated and run concurrently. Formal instruction takes place at the TWR, and the practical component at approved clinical training centers under the supervision and guidance of clinical supervisors. Therefore, the teaching and learning of radiography is a process that is lecturer-driven at

TWR and clinical supervisor-driven at hospitals or clinics. All students come to the TWR for lectures on a two-week block system. First year lecture blocks normally coincide with that of either the second or third year students. Second and third year lecture blocks never coincide. The main reason for this arrangement is to accommodate off-campus clinical training centers that they should always have senior students.

As stated earlier, in HE it is expected of learners to be self-directed. Diagnostic radiographers assume very critical and important roles in health care institutions. They work independently in making decisions about appropriate x-ray procedures that could answer different clinical questions as requested by physicians who need to make informed patients' diagnoses.

1.3 PURPOSE OF THE STUDY

"The established educational system is limited to preparing the individual for employment rather than life as a whole."

Peter Shepherd (Source unknown)

"Why didn't they teach me this at school?"

A former National Diploma Radiography student sighs when confronted by the demands of the world of work and profession challenges. The challenges among others are, responsibility for the job itself, keeping abreast of knowledge, the requirements for CPD activities, community service, long-term career prospects and the world wide web with its abundant information, the highly computerised x-ray machines and the psychodynamics of patient care. As mentioned earlier in this chapter, many universities are placing specific emphasis on the development of self-directed learning (SDL) or lifelong learning skills as one of the primary goals of a university education, and technikons cannot be excluded. With the rapid change and technological advancements in the world of work, institutions of higher learning should assume more responsibility for helping students to acquire SDL skills in their courses.

According to the South African Qualifications Authority (SAQA), the qualifications framework will address some key issues (integration and coherence, access, articulation, progression and portability, credibility and legitimacy) of education in a transparent way for all users of the education system (Mhlongo, 2002:2). In this way, the notion of learning is being expanded from simply traditional

learning to include lifelong learning. A lifelong learning perspective implies teaching students to be self-directed. Based against this backdrop and the lack of official SDL teaching and learning programmes and strategies in the radiography department at the TWR (no SDL documentation exists in other departments within the TWR) prompted the researcher to undertake this study in assessing the readiness of diagnostic diploma radiography students to engage in SDL.

There are a number of factors that pertain to SDL, however, the researcher is of the opinion that establishing the level at which students in the National Diploma Radiography: Diagnostics at the TWR are ready to engage in SDL, is one of the most necessary and important steps if one considers the implementation of SDL. Robotham (1995:1) asserts that the first step in attempting to develop self-directed learning is to assess the correct level of self-direction that an individual is able to exhibit at present.

As the researcher undertook to investigate the readiness of students to engage in SDL in the National Diploma Radiography: Diagnostics, at the TWR, an attempt to find answers to the following questions was sought:

- do students registered for the radiography diploma programme perceive themselves to possess skills and attitudes associated with SDL and if so,
- at what level are most of the students registered for the National Diploma Radiography: Diagnostics at the TWR are ready to engage in SDL?

1.4 RESEARCH GOALS

The research goals of this study were:

- to conceptualise SDL as a teaching and learning strategy in higher education.
- to establish the level at which most National Diploma Radiography: Diagnostics students at the TWR are ready to engage in SDL.
- to identify factors that could influence the implementation of SDL in the diagnostic radiography diploma programme.
- to recommend the framework for which diagnostic radiography diploma students at the TWR can transcend into self-directed lifelong learners.

- to provide input on SDL for the National Diploma Radiography: Diagnostics at the TWR and other institutions offering the programme.

1.5 MOTIVATION FOR THE RESEARCH

The study was motivated by the need to investigate the level at which National Diploma Radiography: Diagnostics students are ready to engage in SDL at the TWR. Hiemstra (1994:5b) asserts that in many respects, learners will need to become self-directed throughout their lives just to cope with the enormity of information available to them. On the other hand, Fisher (1999) states that self-directed learning teaches and prepares learners for lifelong learning. Fischer and Scharff (1998:10) maintain that a lifelong learning perspective implies that schools and universities need to prepare learners to engage in self-directed learning processes because that is what they will have to do in their professional and private lives outside the classroom. Implementing SDL in this programme can afford students the skills for lifelong learning.

According to Piskurich (1993:25) the first step in using self-directed learning is to decide whether you can use it or not. Fisher (1999:4) supports this view from another perspective by stating that, "for the professional instructor, the secret is knowing when and when not to use self-directed learning methodologies". Fisher (1999) points out that all adults and all situations dealing with adults do not necessarily call for the adoption of SDL teaching and learning strategies. Therefore, to make SDL successful, both students and teachers need a clear understanding of the rationale, process and a commitment to make it work (Seabrook, 2000:2). Students must be ready to be self-directed for successful implementation. In practice, educators can adapt their strategies to different levels of self-direction that learners exhibit in various situations. "Some people are simply not ready to engage in self-directed learning" (Beitler, 2000:2). However, SDL is seen as a necessary process for achieving worthwhile and meaningful educational outcomes that strive for quality education. It is important that before implementing self-directed learning, an assessment of the readiness of students to be self-directed is undertaken.

From 2003, all radiography students are required to do a year of community service on completing the National Diploma Radiography: Diagnostics, Nuclear Medicine and Therapy before full registration with the Health Professions Council of South Africa (HPCSA). Further, from April 2002, all practicing radiographers (diagnostics, nuclear medicine, ultra sound and therapy) are required to participate in a compulsory system of continuing professional development (CPD) (see appendix 1). A predetermined

number of CPD points (20) are required yearly for the maintenance of certification. Documentation of CPD activities can be requested by the HPCSA to validate study credits. CPD points can be earned by attending or participating in workshops, seminars and congresses, reading of journals and answering questions in journals and many other accredited activities. According to Shannon (2000) small group learning, journal clubs, traineeships, practice audits and reviews and keeping a learning portfolio are all CPD formats that encourage self-directed learning. The creation of early opportunities for self-directed learning can afford radiography graduates to engage in lifelong learning like CPD and be ready to acquire new knowledge and understanding, which is what the profession requires of them.

The question that comes to mind is, are the National Diploma Radiography: Diagnostics students at the TWR ready to be self-directed in order for them to pursue lifelong learning after leaving the formal academic institution? Self-directed learning (SDL) is a learner-focused strategy. A learner-focused learning strategy assumes that it is the student who reconstructs his or her knowledge to produce a new world or conception. On the other hand, learners may not be prepared to take charge of their own learning due to traditional educational experiences or their non-familiarity with the content of the programme. Piskurich (1993) asserts that it is essential that learners are prepared to take responsibility for their own learning.

With the professional demands placed on the diagnostic radiographer it is appropriate that the teaching and learning in the radiography programme is reviewed and restructured to be self-directed. It is interesting to note that Angelo (1999:99) raises the question as to why the vast majority of well-intended change efforts seem to result in little or no long-term improvement in student learning. To answer the question, Angelo (1999:99) cites Ewell (1997) who suggests two answers: firstly, that change efforts have been implemented without a deep understanding of what "collegial learning" really means and the specific circumstances and strategies that are likely to promote it. Secondly, the change agents have, for the most part, been attempted on a piecemeal basis both within and across institutions. Therefore an attempt to introduce SDL in the diagnostics radiography diploma programme at the TWR without any prior knowledge as to whether students are ready to be self-directed or not, might produce some unintended results. According to Piskurich (1993) self-directed learning is a technology that will work for some educational and training needs and not well for others.

The diagnostic radiography programme will be restructured in the near future to facilitate outcomes based education (OBE) principles. SDL is a suitable teaching and learning strategy that can produce lifelong learners. By being lifelong learners, diagnostic radiography students will be better able to meet

the changing demands of the profession after training, for example participating in CPD activities. To further illustrate the need for SDL in the diagnostic radiography programme, Fisher (1999:1) maintains that workers who are employed will need major retraining or upgrading of skills at least every five years to maintain their positions. This is also applicable in the radiography profession because at several work places, senior positions are reserved for those with experience and a higher qualification, for example a B Technology Radiography: Diagnostics.

A number of graduates who completed their National Diploma Radiography: Diagnostics are furthering their studies in B Technology Radiography in Diagnostics, Nuclear Medicine, Ultra Sound or Therapy at the TWR and other institutions offering the programmes. Some of these learners are recent diploma graduates whilst others completed their diplomas some years ago. The B Technology Radiography degrees offered at the TWR are predominantly self-study. A number of these B Technology students experience difficulties in adjusting from instructor-driven learning to self-study. Based on this study, the researcher can only speculate that should SDL be introduced in the National Diploma Radiography: Diagnostics at the TWR, the graduates that will leave the institution can do so equipped with the skills that might best meet the challenges and demands of their world of work and profession.

1.6 CLARIFICATION OF CONCEPTS

1.6.1 Radiographer

Radiography can be divided into four disciplines. The use of radiographer in this study refers the any radiographer of the four disciples. The radiographer is the professional who is trained in any of the four disciplines mentioned below.

Diagnostic radiography (DR) refers to the radiographer who is trained in the diagnosis of disease using x-rays.

The *nuclear medicine radiographer* (NMR) is trained in use of gamma rays in the diagnosis of disease as well as the treatment of disease using beta ray

The r*adiation therapy radiographer* (RTR) is trained in the treatment of cancer using deep X-ray therapy.

The *ultrasound radiographer* (USR) is part of the diagnostic imaging team trained to use complex equipment to produce images using high frequency sound.

Currently the TWR offers all four disciplines at diploma level except Ultrasound Radiography that is offered at B. Technology level. In the Gauteng Province the TWR is the only institution offering all four disciplines up until D Technology level.

1.6.2 Level

The Concise Oxford Dictionary of Current English has a number of definitions for the term level. The one relevant to this study is "a social, moral or intellectual standard". Herbeson (1991) relates the term to the educational background that is the number of years of formal schooling. In this study, the term level denotes the year of study, i.e., first, second or third year of study.

1.6.3 Radiography programme

A programme is defined as a course or a series of studies, lectures, etc (The Concise Oxford Dictionary of Current English). Radiography programme in this study refers to the radiography course comprising of the theory and the clinical components that run concurrently during training.

1.7 OVERVIEW OF RESEARCH DESIGN AND METHODOLOGY

Researchers often confuse research design and research methodology, but these are two different aspects of a research project (Mouton, 2001:55). The author refers to research design as a blueprint of how one intends conducting the research. In the most elementary sense, the design is the logical sequence that connects the empirical data to the study's initial research questions, and ultimately to its conclusion (Yin, 1994:19). On the other hand, methodology refers to the overall approach to the research process, from the theoretical underpinning to the collection and analysis of the data (Hussey and Hussey, 1997:54).

According to Cohen, Manion and Morrison (2000:73) the purposes of the research determine the methodology and design of that research. The source of this study is based on information gathered from National Diploma Radiography: Diagnostics students at the TWR. The data collected was intended to provide information on the level at which most student are self-directed. with the intention

to implement SDL in the National Diploma Radiography: Diagnostics programme by assessing the students' readiness to engage in SDL.

1.7.1 Research design

The researcher intended to determine the relationship between self-directedness and the level of study in the National Diploma Radiography: Diagnostics at the TWR as a way of understanding and accumulating knowledge about SDL with the intention of recommending the implementation of SDL in the Department of Radiography at the TWR.

Research design gives a detailed plan that one uses to guide and focus one's research (Hussey and Hussey, 1997). The central issue in this study was the determination of the level at which students were ready to engage in SDL in the radiography diploma programme. A descriptive survey assuming a quantitative method was used for this study.

According to Cohen, Manion and Morrison (2000:169), descriptive research looks at individuals, groups, institutions, methods and materials in order to describe, compare, contrast, classify, analyse and interpret the entities and events that constitute their various fields of inquiry. Surveys, at the same time gather data at a particular point in time with the intention of describing the nature of existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events (Cohen, Manion and Morrison, 2000:169). A descriptive survey is the first and elementary level of research activity. It is of major importance for the understanding and accumulation of knowledge.

1.7.2 Research methodology

Research methodology focuses on the research process and the kind of tools and procedures used. These are briefly discussed below and are addressed in more detail in chapter 3.

1.7.2.1 Data collection instrument

The Self-Directed Learning Readiness Scale (SDLRS) was used as the instrument for data collection from students (see appendix 2). Guglielmino developed the SDLRS for her doctoral dissertation at the

University of Georgia in 1977 (Beitler, 2000:2). The scale was designed to indicate readiness to engage in self-directed learning. The instrument is a 58 item five-point Likert scale representing the following values; almost always true, usually true, sometimes true, usually not true and almost never true. Forty-one (41) of the items are positively phrased and seventeen (17) are negatively phrased (Delahaye and Choy, 2002). The scale measures attributes like attitudes, values and abilities relating to students' readiness in SDL at the time of responses. Delahaye and Choy (2002) cite Guglielmino (1978) who maintains that the SDLRS is designed for the academic fields in high school, college or tertiary institutions.

A number of studies have provided evidence of the reliability and the validity of the Self-Directed Learning Readiness Scale (Guglielmino and Klatt, 1993:3). These authors cite McCune, Guglielmino and Garcia (1990) who advocate that the SDLRS measures constructs such as love for learning, self concept as an effective independent learner, tolerance of risk, ambiguity and the complexity in learning, creativity, view of learning as a lifelong beneficial process, initiative in learning, self-understanding, and acceptance of responsibility for one's own learning. These attributes are associated with SDL.

1.7.2.2 Method of data collection

Copies of the SDLRS were distributed to the first, second and third year students registered for the National Diploma Radiography: Diagnostics at the TWR between August and September 2003. This was done during class time. The questionnaires were collected immediately after completion. Request for certain personal data such as age and gender are included in the scale. Anonymity was exercised by not requesting students to disclose their identities. Each student was randomly allocated a unique number for purposes of data analysis.

1.7.2.3 Data presentation and analysis

Data collected for this study were analysed using descriptive statistics. According to Bell (1993:173), raw data taken from questionnaires, interview schedules, need to be recorded, analysed and interpreted. Scoring of the SDLRS was done and presented. The sample mean, standard deviation, variance, range, standard error, minimum and maximum scores, skewness, number of valid observations and missing observations were presented. Comparisons of individual scores to the mean and to the adult norms were done. Tables, histograms and summary statistics were used for final data presentation. The Statistical

Package for Social Sciences (SPSS) for Windows 11.1 and the Excel spreadsheets were used for data analysis.

1.8 DELIMITATION OF THE RESEARCH

The respondents from this study came from one institution, the TWR. The study was limited to full-time first, second and third year students registered for the National Diploma Radiography: Diagnostics during the year 2003. The number of students registered for the programme was 62 in first year, 40 in second year, and 58 in third year giving a total of 160 students. B Technology Radiography students from all the four disciplines were excluded from the study because most of their content is self-study with minimal lecturer contact as compared to the national diploma students. This is in line with B Technology principles at the TWR. The B Technology Radiography: Diagnostics at the TWR is offered on a part-time basis. The other three B Technology Radiography disciplines that is, Nuclear Medicine, Radiation Therapy and Ultrasound are offered on a full-time basis as second category qualifications and lecturer contact times vary in each discipline.

1.9 ETHICAL ISSUES

Researchers should adhere to ethical principles when conducting research studies. Greenfield (2002:179) states that survey researchers have responsibilities towards at least four categories of people, namely:

The public. The responsibility here is to ensure that the survey results are presented fairly in public and to correct any distortions in the way others use the survey results in public,

Clients/sponsors. Research should respect the confidentiality and rights of sponsors and not make unwarranted claims about one's expertise or about the value of the techniques that will be employed,

The profession. It is important not to act in ways that will discredit the profession or make it difficult for other researchers in the future to conduct research because of your actions and.

Respondents. The responsibility to respondents refers to conducting the survey in such a way as to ensure that:

- The respondents give informed consent.
- Participation is voluntary.
- Confidentiality is protected.
- No harm comes to participants.

To be in line with some of the ethical issues mentioned above the following was done:

A full explanation of the reasons and benefits of the study was given to the students before the administration of the questionnaire. Students not willing to participate were at liberty to do so without censure or victimization. Students' confidentiality was maintained by asking them not to disclose their identities. Numbers were randomly allocated to each respondent but were in no way linked to names. The numbers were for statistical analysis and for tracing missing responses.

Respondents were informed that the research findings would be available in the Department of Radiography as soon as the thesis was completed.

Consent to administer the questionnaire to the students was obtained from the TWR's Deputy Vice Chancellor academic (see appendix 3). The head and lecturers of the department of radiography were informed of the intended study and data collection in a departmental meeting. The SDLRS was purchased from Guglielmino and Associates who are custodians of the scale (see appendix 4). This was in line with the requirements for the use of the SDLRS.

1.10 OUTLINE OF FURTHER CHAPTERS

In chapter 2, the literature review relevant to this study was explored and summarised. Research design and methodology were described in chapter 3. The instrument used for data collection (SDRLS) was comprehensively dealt with in chapter 3. Presentation and analysis of data was covered in chapter 4. In chapter 4 tables and histograms were used to illustrate trends visually. Chapter 5 was dedicated to the conclusion, recommendations and directions for the future.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, the literature review on SDL was undertaken as a way of conceptualizing this teaching and learning strategy. The literature review revealed a significant amount of information related to SDL. The information obtained was particularly directed towards defining SDL as a teaching and learning strategy, the benefits of self-directed learning, the self-directed learner, the role of the facilitator, preparing and implementing self-directed learning, resistance to self-directed learning and how to overcome resistance to self-directed learning. A brief summary of the main points completed the chapter.

2.2 DEFINING SELF-DIRECTED LEARNING

SDL has been defined in different ways by different authors. Garrison (1987:1) states that a serious problem in understanding the nature and form of self-directed learning is the terminology and the conceptualization confusion that exists. Further, Grow (1991) advocates that, defining the term self-directed learning remains the "North Pole" of adult education and nearly everyone manages to set his or her own compass by it. In spite of its complexities, few people have defined SDL with precision, and, even when they do, the meaning of self-directed learning unexpectedly shifts to a new location, Grow (1991) further asserts. No single definition has been arrived at, because every attempt to define SDL has been done so from a different context. According to Long (1994), differences among major paradigms have been used to define SDL. Since SDL cannot be encapsulated into a single definition, a few definitions are presented, followed by a short synthesis of the definitions as a way of conceptualizing the meaning of SDL, as well as to build on the understanding of SDL as a teaching and learning strategy in higher education.

The definitions presented in this study were extrapolated from some of the pioneers of SDL and adult education. SDL assumes various terms like, self-teaching, autodidactic activities, self-managed, autonomous learning, self-managed learning, self-regulated and individualised learning, just to mention a few.

> Knowles (1975:18) a pioneer of adult learning, defines SDL as a process in which individuals take the initiative with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate strategies and evaluating learning outcomes.

Knowles' definition is based on methodological and andragogical conceptualisation (Long, 1994b). Knowles defines SDL in terms of the learning and teaching methods as occurring either in a group or in an individual. The process is when individuals take the initiative with or without the help of others in diagnosing their learning needs. The conceptualisation includes a multiplicity of learning contexts, such as university sponsored face-to-face classes, correspondence, televised courses and computer-based methodologies (Long, 1994:33b).

Knowles' definition is quoted in many articles. It highlights the main issues in SDL. The learner is the central person taking "charge" of learning. The definition describes a system's approach to learning; input (individual diagnosing learning needs), process (choosing and implementing appropriate strategies) and output (evaluating learning outcomes). The definition though falls short of mentioning the role of the facilitator, an important person in SDL.

> Brockett and Hiemstra (1991) define the term SDL as an instructional process centering on such activities as assessing needs, securing learning resources, implementing learning activities and evaluating learning.

Brockett and Hiemstra's definition is included in Knowles's conceptualization with an addition of the concept of, "assessing needs." Here the learner is assumed to be in what Long asserts as, direct control of the assessment of the learning that may occur in situations where ownership is shared.

> Piskurich (1993:4) defines self-directed learning as a training design in which trainees master packages of predetermined material at their own pace, without the aid of an instructor.

Piskurich's definition assumes a training context. This definition is likely to cause confusion to those in academic environments where the word "learner" is widely used. Piskurich (1993:4) acknowledges this by stating that, the definition is not the only possible definition, nor is it all-inclusive for any one

learning environment. Further, the phrase, "at their own pace, without the aid of an instructor." can result in some resistance to SDL (Myth 2, see 2.8*)*. Nonetheless, the phrase "at their own pace" highlights a common aspect in most SDL definitions.

> Caffarella (1993:25) defines SDL as a self initiated process of learning that stresses the ability of individuals to plan and manage their own learning, an attribute or characteristic of learners with personal autonomy as its hallmark and a way of organizing instruction in formal settings that allows for greater learner control.

Caffarella's definition brings to the fore the characteristics of the learner. One can deduce from the definition that the learner should have certain characteristics to be self-directed. These characteristics are stated later in this study (see 2.5). The definition also answers the question about whether SDL takes place in a formal or informal setting. For the scope of this study, the premise set by this definition that, SDL is "a way of organizing instruction in formal settings" will suffice. Further, Abrams (2000:2) asserts that self-directed learning is the complement, even the antithesis of formal education. SDL does take place in informal settings, but the focus in this study was on formal settings.

> Long (1994) defines self-directed learning as a purposive mental process, usually accompanied and supported by behavioural activities involved in the identification and searching out of information. The learner consciously accepts the responsibility to make decisions about goals and effort, and is, hence, one's own learning change agent.

Long's definition is psychologically conceptualized. The learner determines the degree to which learning is self-directed by his or her cognitive activity (Long, 1994b). Personality, usually accompanied and supported by behavioural activities, appears to be an important factor in initiating self-directed learning. Cognition is linked to six skills namely, goal setting, processing skills, other cognitive skills (sensory, memory), some competency or aptitude in the topic or a closely related area, decision making skills and self-awareness.

> Guglielmino and Guglielmino (2001:37) define SDL as a process in which the learner is responsible for identifying what is to be learned and how it should be learned.

Guglielmino and Guglielmino's definition is conceptualized in a more or less similar way to that of Knowles. The notion of, "the learner is responsible" adds to the understanding of SDL as eliciting responsibility from the learner.

> Greyling, Geyser and Fourie, (2002:113) define SDL as a goal or product and as a process. The definition implies that there are activities that are involved in order to accomplish something (goal), which may be to graduate.

SDL definitions are exhaustive and the above are just a few examples. The few examples stated above were meant to illustrate that SDL is contextually defined and learner focused. As mentioned earlier in the chapter, SDL means different things to different people. The definitions are not all embracing as stated earlier. Therefore it is important to look at different definitions in order to have a clear understanding of this phenomenon, SDL.

Based on the definitions stated above, the following was extrapolated about SDL.

- SDL is about a process that involves learners making decisions (about their own learning) that work better for them in order to reach goals.
- SDL as a process refers to learners having choices about the direction they pursue in learning, based on the responsibilities they assume towards their own learning.
- Other tenets central to the concept of SDL are that the control shifts from the educator to the learner. Learners exercise some independence in the learning process.
- Curriculum or content are not mentioned in any of the quoted definitions. However, it can be assumed that curriculum or content are essentially not the learner's responsibilities but are for the institution and the educator.
- SDL is about the interaction between learners, facilitators and the institution with more focus placed on student learning.

Furthermore, in a study by Hewitt-Taylor (2001) on SDL of nurses, the conclusion reached was that nursing teachers and students found defining SDL precisely difficult. The author warned that attempting such a definition and categorizing SDL as a tangible concept may reduce it to a teaching method, denying it its richer nature and obscuring it from its perceived value.

In summary, SDL can be referred to as a goal or a process, learner-driven to achieve outcomes, learner-centered and learner-independent. Educators and institutions provide the environment in which the learner operates independently and accepts responsibility for own learning. Given the above definitions, one can conclude that, without the knowledge of the specific contexts, it can be difficult to determine the proper meaning of SDL.

2.3 SELF-DIRECTED LEARNING AS A TEACHING AND LEARNING STRATEGY

SDL is a learning strategy that can be aligned with Vygotsky (1896-1934) who was one of the theorists associated with constructivism in learning. Constructivists believe that learners construct their own reality or at least interpret it based on their perceptions of experiences. According to Mergel (1998:8), an individual's knowledge is a function of one's prior experiences, mental structures and beliefs that are used to interpret objects and events. Based on this theory, SDL learners are perceived to be in control of their own learning because they construct their own learning, deciding what, how and when to learn.

Zemke (1998:1) asserts that self-directed learning is based on the assumption that people will actively apply themselves to learning and mastering the skills that their employers want them to learn. The author further maintains that adults are found to be highly orientated towards SDL. This is premised on idiosyncratic needs of the individual learner because he or she plans and directs his or her own learning according to own time schedules.

According to Spencer and Jordan (1999:4) self-directed learning is an active process that encourages the adoption of the deep approach to learning, first described in the mid 1970s. Deep learning is an active search for understanding. It involves an intention to understand and give meaning by focusing on relations between parts of the subject matter or the structure of the problem as a whole Mji (1999:156) cites Ramsden, Martin and Bowden (1989). Courses that foster deep learning commonly provide a

context in which students are motivated by the need to know, active learning and exploratory work in small groups and a well structured knowledge base.

The other side of the coin is surface learning. Surface learning merely encourages students to reproduce what they have learnt either by memorizing or applying procedures unreflectively (Mji, 1999:156). To pursue the deep and surface learning approaches further, Spencer and Jordan (1999:4) differentiate between surface and deep learning by stating that a surface approach is common in courses that have a heavy workload, an excessive amount of course material, little opportunity to pursue subjects in depth, little choice over study topics, and an assessment system that provokes anxiety and mainly rewards reproduction and factual information. Long (2000) asserts that the SDL learner engages in deep cognitive processing, an important activity associated with self-directed learner activities. The author lists the following as deep learning processing skills:

The learner:

- Derives enjoyment from the activity.
- Searches for meaning in the information.
- Often personalizes the task by relating it to own experience.
- Relates bits and parts of the information, relates evidence to conclusions and relates the whole to previous knowledge.
- Develops theories, forms hypotheses and many others.

On the other hand, surface learning processing includes the following:

- Learning is perceived as a task, a demand or requirement that is a necessary imposition to achieve a goal.
- Learners see aspects of parts as discrete and unrelated to each other or to other learning goals.
- Learners avoid personal or other meanings the learning activities may have.
- Learners rely on memorization, attempting to reduce, to reproduce the surface of the learning task, repeating words, diagrams rather that rephrasing or elaborating as a means of understanding.

As SDL is associated with deep learning, an assumption can be made that SDL allows learners to be effective learners and social beings. Learners take charge of their own learning without relying on

knowledge being transferred from the "head" of the teacher to the learners' "heads". Learners rely on internal factors like enthusiasm, independence, interest, curiosity, commitment, creativity, open mind, self-concept and many others in order to be effective learners. External factors include resources, finances, social demands, time, infrastructure and environments, learning contracts, opportunities and content. Based on internal and external factors that SDL learners rely on, Lowry (1989:1) asserts that "whether or not learning is self-directed, depends not on the subject matter to be learned or on the instructional methods used, instead, self-directedness depends on who is in charge, who decides what should be learned, who should learn it, what methods and resources should be used and how the success of the effort should be measured."

According to Spencer and Jordan (1999), the following are strategies that have been developed as self-directed learning;

- problem based learning
- discovery learning
- task based learning
- experiential and reflective learning
- portfolio based learning
- small group, self instructional and project based learning; and
- peer evaluation and contract learning

Furthermore, De Boer (1994) identified the following as teaching strategies to promote SDL: small group work, peer tutoring, learning contracts, self-evaluation, reflective learning, role-play and informal quiz.

Clearly, not all students will be ready to engage in SDL activities. Many if not all will need help to understand the purposes benefits of SDL as a teaching and learning strategy. Further, Habeshaw, (1995) says "if we have learnt anything from educational research over the last 20 years it is that students have diverse approaches to learning". Habeshaw (1995) identified surface and deep approaches to learning that learners adopt. Since SDL has been associated with the deep approach to learning, the facilitator should therefore ensure that should SDL be adopted as a teaching and learning strategy of choice the appropriate strategies should be used.

2.4 BENEFITS OF SELF-DIRECTED LEARNING

Learning and the world of work can no longer be dichotomized. Knowledge is often redundant by the time a student graduates and enters professional practice. It is imperative that educators ensure that, at graduation, students are well equipped with the SDL skills that they will need in order to keep abreast of burgeoning knowledge (Ryan, 1993:1). The shelf life of most acquired knowledge during training is considerably short, based on the advancement of technology in the work place. According to Slabbert (1993) the content taught today may be outdated tomorrow due to the fact that we live in an information-oriented world and new content is produced daily at a virtually incomprehensible rate. "No longer viable is the assumption that formal teacher-led classroom instruction is the most effective method" (Durr, Guglielmino and Guglielmino 1996:350). The authors further advocate that alternative learning methods must be explored, understood and developed, and one promising option is SDL.

Hiemstra (1994b) advocates that several researchers have demonstrated that, giving the learning responsibility back to the learners in most instances is more beneficial than other approaches, for example teacher-led strategies. SDL is seen as valuable because it is believed to enhance creativity, help avoid blind acceptance of existing knowledge and encourages the use of energies for what is personally important and consistent with personal values and adaptation to a rapidly changing environment (Greyling, Geyser and Fourie, 2002:113).

According to Piskurich (1993), self-directed learning offers greater individual flexibility in the learning process. Different skills at different levels are accommodated in SDL based on learner needs. SDL can be useful in today's changing work environment contributing to the solution of problems typically associated with traditional learning techniques (Dejoy and Dejoy, 1987:1). Self-directed learning does not only help people to learn better, but also has the potential to support learning organizations, total quality management, re-engineering and other systems change (Hatcher, 1997b).

From the benefits of SDL stated above, one can assume that learners are empowered to take control of the learning process. Learners get encouraged when afforded the opportunity to develop their own rules

and learning patterns. Student input into selecting a variety of course activities not only provides motivation, but also offers encouragement and helps promote the idea that every student can excel in some aspect of the course (Metzger, 1999:145). SDL is available when trainees or learners are ready and can work at their own pace. This is possible because learner packages are always ready for learners to engage in SDL once it has been decided to go the self-directed way.

Other benefits of SDL as advocated by Kroenke (2003) are:

- Learner choice can be considerable in what to look up, what is found and how it is organized. The result may be of greater salience to the learner's interest and needs and more memorable.
- Evaluation of learners may be more substantive, especially in terms of their motivation and skills to seek answers and how well they evaluate and synthesize what they find.
- It decompresses teaching by asking the learner to shoulder some of the responsibility for formulating the relevant questions and finding and organizing the answers. This distribution of the teaching load relieves the teacher of being responsible for having to transmit large quantities of knowledge in a given situation.
- A philosophy of lifelong learning is encouraged rather than an undue emphasis on learning "up front".

It is important and beneficial to develop students' capacity for SDL and self-growth in preparation for the world of work that is continuously under tremendous pressure to create a learning environment for their employees.

2.5 THE SELF-DIRECTED LEARNER

In an interview, Hatcher (1997:1a) asked Knowles the question, "How would you describe a self-directed learner?" Knowles responded, "Someone who perceives it his or her primary responsibility to carry out personal learning projects or programs with the help of a facilitator and other resources". Based on some of the definitions of SDL mentioned earlier in this chapter and Knowles' response to

Hatcher's question, one can deduce that a self-directed learner takes responsibility for own learning. This is the cornerstone of the self-directed learner. The self-directed learner is assumed not to be a receiver of information or knowledge from the teacher in a passive way, but rather utilizes the facilitator as an external source of information should the need arise.

Candy (1991) identified the following characteristics that learners should exhibit in order to be considered self-directed.

- Ability to identify own learning needs.
- A positive view of own learning capabilities based on past experiences.
- Ability to set appropriate goals expertise in selecting learning strategies for a particular situation.
- Ability to be self-motivated and to be self-disciplined.
- Awareness of how to learn and own learning strengths and weaknesses.
- Knowledge and skills in learning.

The characteristics mentioned above are necessary because, according to Shannon (2000), the self-directed learner takes the initiative in learning, selects the content, determines the learning method and controls the pace of learning. Such a responsibility requires more from the self-directed learner as compared to the traditionally taught (relying on information from the lecturer) learner who assumes a passive role as a receiver of knowledge.

A self-directed learner does not operate as a passive receiver of information, but takes responsibility for own learning and achievement. Unfortunately the learner for whom self-directed learning is designed and developed may be unwilling and unprepared to engage in SDL. Self-directed learning may be a natural attribute of human beings, but Zemke (1998:7) states that self-directed learning advocates maintain that years of other-directed education (teacher-directed) have turned many of us into passive non-learners.

Apart from the characteristics stated above as advocated by Candy (1991), Price (2000:1) cites Radloff and De La Harpe (1999) who assert that, as self-directed learners, students should have the abilities to:

- identify and set personally meaningful goals for their own learning;
- develop and use a wide range of learning strategies appropriate to different learning tasks; and
- work independently and/or with others to achieve their learning goals and persist to overcome obstacles in order to achieve their learning goals.

Furthermore, Garrison (1997) cites Zimmerman (1989) who associates SDL with a person's ability to:

- decide what knowledge and skills to learn;
- diagnose his/her learning needs realistically, with help from teachers translate his/her learning needs into learning objectives in a form that makes it possible for the accomplishments to be assessed;
- relate to his/her her teachers as facilitators, helpers, or consultants and to take the initiative in making use of their resources;
- relate to his/her peers collaboratively, to see them as resources for learning;
- identify human and material resources appropriate to different kinds of learning objectives;
- select effective strategies skillfully and with initiative;
- gain knowledge or skill from the resources utilised;
- evaluate his/her work and get feedback from others about progress;
- detect and cope with personal blocks to learning; and
- renew motivation for learning when motivation lags.

Furthermore, Greyling, Geyser and Fourie (2002:113) cite Candy (1991), Pintrich (1995) and Troskie-DeBruin (1999) who assert that self-directed learning has been associated with a person's abilities; and self-directed learners are characterised by four dimensions, namely, personal autonomy, self-management, independent pursuit of learning and learner control. The above abilities call for a critical

thinker (a person capable of identifying and challenging assumptions and conceptualising and exploring alternatives). Candy, (1991) advocates that critical thinking is considered an important skill for self-directed learning.

"Most learners are not able to start off as self-directed learners because their prior conditioning was that, the learner was a passive recipient of transmitted information" said Knowles, in an interview with Hatcher (1997:2a). Even though it is advocated in the literature that adult learners prefer to be self-directed, some form of intervention will be required in one way or another to assist the learner to transcend gradually to become self-directed. The intervention would mostly be from the facilitator. The facilitator might be required to guide learners at least initially to, setting goals, establishing learning activities and evaluating individual progress. It is against this backdrop that the facilitator comes into the picture in SDL.

2.6 THE ROLE OF THE FACILITATOR IN SELF-DIRECTED LEARNING

Facilitators in SDL are not instructors or teachers. Piskurich (1993) identifies four possible roles for the facilitator: those of introducer, performance observer, package/programme evaluator and trainee educator, and hints that the role of the facilitator is not confined only to the four roles mentioned.

Piskurich (1993) asserts that the first, and the basic role of the facilitator, is that of orientating trainees to the SDL package. The facilitator as an introducer simply hands the SDL package to the trainees and gets out of the way (Piskurich, 1993). The facilitator makes available all resources needed, supplies like computers or any special equipment. Usually the facilitator can devote a few minutes to explain what SDL is and how the trainees are expected to work with the SDL packages. Should a need arise, the facilitator can be responsible for introducing the entire SDL system to the trainees. This will be necessary where trainees might not be familiar with the SDL programme at all.

As a performance observer, the facilitator may be required to observe practice or demonstration, and possibly provide feedback. This part of facilitation requires a subject matter expert.

The facilitator's role as the package evaluator is a mechanical one. The role pertains to handing out and monitoring some type of opinionnaire evaluation instrument and then collecting and forwarding or completing it. Also record keeping is part of the facilitator's role as package evaluator in SDL.

As the evaluator of trainees, the facilitator's role is that of certifying the mastery of the SDL package by each trainee. It is critical that the facilitator is a subject content expert in order to effectively fulfill this role.

Generally, the role of the facilitator is largely that of aiding learners to meet the educational needs that the learner feels are meaningful and important. Facilitators do not teach or instruct learners, but can suggest meaningful and appropriate suggestions or alternatives to learners that may be lacking in self-directed skills.

Facilitating SDL is different from lecturing or other types of instruction in which the educator assumes the leading role. According to French (1995) some educators are skeptical that SDL is an effective vehicle for academic content that has traditionally been taught, primarily, through a lecture or other methods. Most educators have learnt (themselves) through lectures, and successfully used the lecture method. These educators are of the opinion that they decide what, how and when study material is to be taught and are termed subject experts. In SDL, the educator has to deal with the changed role of standing in front of the classroom dispensing knowledge to that of an overseer of the SDL process.

Nonetheless, Garrison (1987:311) cites Brookfield (1986) who maintains that self-directed learning does not mean that the learner has total control over the selection of goals, development of the curriculum and evaluation of success while the facilitator serves as a resource person without an

"active, initiating, constructivist role in the educational process". Garrison (1987) maintains that, although student autonomy is a central feature in self-directed learning, it must be realized that this is not meant to imply that the goal is the ability of learners to be able to learn in an isolated context. The shift of responsibility for learning to learners does not diminish the importance of the facilitator. According to Ponton, (2000), the facilitator promotes autonomy that will not only enhance students' formal educational experience, but will provide them with the psychological under girding essential for lifelong learning. A teacher becomes a guide or facilitator; the time normally spent in lecturing can be used to facilitate small group work, promote peer interaction and answer individual questions.

According to Piskurich (1993) the facilitator helps students where necessary, but is not responsible for providing information or answering questions. In SDL, the facilitator's role becomes multidimensional, it changes from that of content giver to that of learning manager, facilitator and resource locator, manager, resource guide, expert, friend, advocate, authority, coach and mentor (Hiemstra and Sisco, 1990).

In SDL, the facilitator can be involved in helping learners make the transition from teacher control to learner control. The facilitator will be required to assist learners to be self-directed using different strategies to address the different needs of learners. According to Slusarski (1994:103), facilitators help learners to take control of their learning by providing them with opportunities for learner decision-making and learner control through the instructional techniques used. The fundamental purpose for facilitating SDL is its potential to improve the quality of learning outcomes in the short and long terms. In supporting the constructivist view of learning that encourages students to approach learning in a deep and meaningful manner, the facilitator creates the educational conditions that will enhance SDL. The role of the facilitator is non-interventionist, unless the trainee seeks guidance (Robotham, 1995:3).

As the learner takes charge of his or her own learning, the facilitator is not removed from the learning process. What is expected from the facilitator has been elucidated above. The facilitator is tasked with more responsibility than the traditional teacher. Not only is the facilitator a possible subject specialist, but also a mentor, introducer, performance observer, package/programme evaluator and trainee educator.

2.7 INSTITUTIONS AS CUSTODIANS OF TEACHING AND LEARNING PROCESSES

Merriam and Caffarella (1991) cite Cervero (1989) who states that educators are not independent agents developing programs in ways they alone deem to be appropriate, rather their concept of a target audience, how best to serve it and what resources are available are conditioned by their particular institutional contexts. The challenge for every institution of higher learning is to transform into viable and learner-centered institutions of teaching and learning. In Lowry (1989), the following are identified as the roles that institutions opting to engage students in self-directed learning can adopt.

- Have the staff meet regularly with panels of experts who can suggest curricula and evaluation criteria.
- Conduct research on trends and learners' interests.
- Obtain the necessary tools to assess learners' current performance and to evaluate their expected performance.
- Provide opportunity for self-directed learners to reflect on what they are learning.
- Recognize and reward learners when they have met their learning objectives.
- Promote learning networks, study circles and learning exchanges.
- Provide staff training on self-directed learning and broaden the opportunities for its implementation.

The quality of teaching and learning taking place at an organization is affected and influenced by what that organization stands for. Students and facilitators can be ready to engage and embrace SDL respectively, but if the institution does not provide an educational climate conducive to SDL, then attempts to introduce SDL can prove futile no matter how noble. As the echoes of lifelong learning filter through HE institutions, SDL will become the norm for higher education institutions. SDL will gain "everyday" usage in higher education institutions.

2.8 FACTORS THAT INFLUENCE THE LEARNER TO BE SELF-DIRECTED

In the preceding paragraphs, it was stated that in SDL the learner takes responsibility for own learning with or without the intervention from other people. Further it was stated that not all learners are ready to take responsibility for their own learning. The reasons for learners not being ready to take

responsibility for their own learning are based on a number of factors. Herbeson (1991) cites Tough (1971) who advocates that past experience, psychological characteristics, other people, community and societal factors are involved in the propensity to be self-directed by learners. Assessment practices have also been linked to influencing the tendency to be self-directed.

For the purposes of this study, past experiences (exposure to other types of learning, learning strategies) assessment practices and the number of years spent in formal education were addressed. Herbeson (1991:197) asserts that one variable that has been shown to display conflicting results is educational background, that is, the number of years spent in formal schooling. Further, the author advocates that there appears to be disagreement as to whether self-direction increases as the level of formal schooling increases.

Box (1982) discovered that there was a significant correlation between the self-directed readiness scores and the cumulative grade point averages between first, second and graduate students. In another study, Durr, Guglielmino and Guglielmino (1996) concluded that the mean scores for each occupational category increased with the level of education attained. Adenuga (1991) also discovered that students pursuing a doctorate programme were significantly more ready for self-directed learning than those in the masters programme.

In a study conducted by Herbeson (1991) on self-direction and the educational level, the conclusion arrived at was that while SDL readiness appeared to increase once a bachelor's degree was attained, it was questionable whether or not the increase was statistically significant. From the studies stated above (Box 1982, Adenuga 1991 and Durr, Guglielmino and Guglielmino, 1996) one can assert that students are inclined to be self-directed as their educational years increase. At the same time, Herbeson (1991) states that factors other than the level of formal education are more important in determining a learners' readiness for self-direction.

With regard to assessment practices, it is important to determine the kinds of assessment procedures that are appropriate and useful to assess the consequences of SDL. Long (1994) advocates that in SDL, assessment is controlled by the learner, unless the learner agrees to some external evaluation for reasons that may have implications for the safety and welfare of others, certification, recognition and so forth. The author further advocates that it is important that assessments of SDL should reflect both the nature of the learning activity and the degree of ownership exercised by the learner.

On the other hand, Scouller (1998:454) advocates that comparative studies investigating whether students prepare differently if they are expecting different forms of assessment procedures are relatively rare. However, the author asserts that mixed results have been produced and those undertaken, seem to support the view that students are strategic and differentially employ learning approaches according to the assessment task. Further, Sutherland of the University of Zululand's Academic Support Programme asserts that there exists a need to correlate teaching aims with assessment aims: "if we teach to encourage deep learning (Entwistle, 1987), which is within the paradigm of a meaning-based pedagogy, we need to use assessment techniques that foster such learning." Sutherland cites Luckett (1995) who advocates that assessment procedures are arguably the single most influential factor contributing to student adoption of deep or surface approaches to learning. SDL is associated with deep learning. Therefore it is important to ensure that assessment practices match with the goals of the learning strategy that one wishes to accomplish.

One of the assessment practices associated with SDL is continuous assessment. This is in view of the fact that continuous assessment is carried out on a continuous basis rather than once off end-of year examinations. At the same time, when assessments are done on a continuous basis, they form part of the learning process. Further, for continuous assessments, students are involved in finding information themselves and this enables them to engage in SDL practices that advocate the deep approach to learning. In some instances, continuous assessment is practiced based on the notion of competence demonstrated by evidence whereby students record daily events in log books and learning projects.

Continuous assessment takes any form of a "mixed bag" of assessment methods. These can be group or individual assignments, poster presentations, case studies, projects and many others. The basis of continuous assessment is that assessment is done on an ongoing basis and is spread throughout the year of study. Peer and self-assessments are normally applied in poster and case presentations. By letting students assess themselves and each other, they are encouraged to take charge of their own learning, which is what SDL is about.

Assessment practices influence the way students adopt learning strategies in that, as long as students hold the belief that the assessment at hand "decides" the pass or fail, students will adopt a different approach to learning.

According to Ramsden (1992), research suggests an association between assessment by examination and the adoption of the surface approach to learning. On the other hand, Scouller (1998) asserts that

students preparing for assignments adopt a deep approach to learning. The process of writing an assignment involves analytical, critical thinking and communication skills, which are suggestive of a deep approach to learning (Scouller, 1998). The writing of the assignment allows students' control over the selection, organization and presentation of their knowledge and understanding, and challenges them to present conditional and metatheoretical knowledge if they possess it, Boulton-Lewis (1995) cited in Scouller (1998).

According to Franz, Ferreira and Thambiratam (1997), final examinations play a large part in what is learnt, as well as with respect to the learning process itself. Furthermore, Price (2000) asserts that the primary barrier to adopting SDL strategies relate to how students are assessed. The author further asserts that, as long as students hold the belief that higher grades alone will assure them the type of job to which they aspire, they will continue to set themselves performance related goals rather than mastery type goals. It is important to note that assessments do exert an influence on how students learn.

Finally, Long, (1994) is of the opinion that in most learning situations, assessment of learning will be done by someone in some form at some level, in that instance, it can be assumed that evaluation of SDL may be complicated by the issue of ownership. With SDL, students own the learning process. Therefore it is important that assessment practices should reflect, to some extent, the ownership by students in order to strike some balance between the learning activities and assessment practices. In SDL, assessment practices can either be owned by the students, in which the students set criteria for assessments or assessment practices can be shared between the student and the facilitator, in which both parties should participate in the assessment. It is problematic when students have no say in assessment practices while they are expected to take charge of their own learning. One can assume that if students are not involved in the assessment practices while they take charge of their learning, the student might not "fully" engage in SDL.

2.9 PREPARATIONS FOR, AND IMPLEMENTATION OF SELF-DIRECTED LEARNING

In view of the fact that most students have extensive experience in teacher-directed classes in which teaching and learning were predetermined by institutions and teachers, the transition from teacher-directed to self-directed learning can be difficult. Therefore the implementation of SDL should be done with sufficient resources, staff support and an understanding of SDL. It should not be implemented as an attempt to deal with increased student numbers and staff turnover in view of the fact that SDL assumes that students work with or without the help of others.

According to Piskurich (1993:174), self-directed learning is designed and developed for use by the learner who needs to acquire knowledge or master a skill. The author further advocates that learners have one thing in common, that is, they are usually not prepared to engage in self-directed learning. This might be true, as stated earlier, even though many aspirant students have matured in an environment that challenged their personal integrity, that spoon-fed them with information and one that required conforming thought. Therefore, to expect them to become instantaneous self-directed learners is rather unrealistic.

Preparing learners for SDL eliminates the confusion that will assail most of them when they are asked to once again become self-directed. "Once again" is based on Piskurich (1993:174) analogy summarized below:

"Children by nature are self-directed. They learn on their own how to talk, walk and get attention without a curriculum from their parents. But as they go into school, their leaning becomes structured. There is now time for everything, reading, breaks and many scholarly matters. The teacher is always there to instill the structure. Later, in higher classes, there is time for history, physics and many others. The teacher decides for the learner what, how and when to learn. The learner has no control on what, how and when to learn and SDL has disappeared. If one spends twelve or more years being told when, how and when to learn, it is confusing to be told at one stage of one's learning career that "you are on your own," even if to be "on your own" was once your way of doing things."

Based on the above-mentioned analogy, one can assert that SDL is an inherent attribute that is repressed through social conditioning. Further, the above analogy supports the fact that an assessment and analysis of a number of factors should be considered before implementing SDL. The factors can concern the learners, facilitators, institutional environments or the institution itself. Students' readiness to self-direction is a priority and this was the basis for this study. The readiness to be self-directed can be identified by an inventory, such as the Self-Directed Learning Readiness Scale (Slusarski, 1994:105) cites Guglielmino, (1977).

This learning acculturation process is why most learners have trouble with SDL, Piskurich (1993) maintains. As a way of preparing learners for the implementation of SDL, the advantages of this

teaching and learning strategy should be communicated to the learners. It is important to communicate only advantages that are relevant to the learners themselves. Institutional and facilitators' advantages do not mean much to the learners. Piskurich (1993) mentions the following as advantages that pertain to learners:

- learners work at own pace;
- availability of learning material when required;
- structure to help the learner to learn more easily;
- long-term reinforcement and review; and
- personal development.

These learner advantages can also form part of the benefits of SDL discussed in 2.4 although they pertain to the learners.

Candy (1991) points out that self-direction is increasingly viewed not simply as an attribute that people either have or do not have, but as a quality that may be present in varying degrees. Guglielmino and Klatt (1993) also affirm this notion by stating that self-directed learning exists along a continuum and is present in each person, to some degree. In practice this implies that educators should adapt their strategies to different levels of self-direction that learners exhibit in various situations. At the request of the learner, facilitators might increase or improve their ability to be self-directed. This is based on the assumption that a learner exercises a great deal of independence in deciding what is worthwhile to learn (in SDL), and how to approach the learning task.

As mentioned earlier, preparing trainees or learners for SDL is a critical factor for its implementation. Hatcher (1997:3a) mentions important assumptions to be considered before implementing self- directed learning. The assumptions are based on the ideas of Knowles, a pioneer in adult education.

- SDL is a different paradigm (transactional relationships between learners, facilitators and learning activities where learners take a leading role) with new beliefs, thoughts and actions to which trainees, trainers and the organization must adapt first through understanding and then through experience.

- Trainers and trainees should understand the structure and culture of the learning environment in which they work. Assessment of an organization's readiness for self-directed learning can be done using a survey. Many people are not prepared to facilitate SDL. They need to address such issues as how much more time it may take to facilitate an individual's learning. They may feel inadequate and miss their authority when learners take control.
- SDL requires time to work. People tend to resist change and seek the status quo, especially when learning new or difficult skills. Facilitators of SDL can help promote change by creating a learning environment that allows time to learn, tolerates mistakes, provides trainees with feedback on their progress, challenges trainees to move beyond the status quo and respects different learning styles and abilities.

It is therefore important to note that the above assumptions are in line with the need to actively involve and prepare students for the new paradigms in their learning. In SDL learners are required to take an active role in learning and teachers (lecturers) to take a facilitating role. The view that teaching essentially boils down to the transmission of knowledge from an external source to the learner is not applicable in SDL.

Preparing learners (for SDL) is not the only critical factor in the implementation of SDL. The environment of the institution into which SDL will operate should be receptive to this teaching and learning strategy. Environment pertains to the physical surroundings. A physical environment promoting effective learning should provide warmth, security, light, comfort, accessible learning equipment and assistance. It is possible to create what is viewed as an appropriate environment for learning through the design of a training course structure (Robotham, 1995:3),

In self-direction, the role of the trainer is not to attempt to overcome the climate fostered by self-directed learner needs, but is to adapt. According to Robotham (1995:3) a rigid training structure that is imposed on individuals may satisfy the course requirements, but may also act as a developmental block for people whose learning attributes do not match the structure. Further, Spencer and Jordan (1999:9) state that creating an environment in which students can learn effectively and efficiently becomes the new prerequisite, demanding not only that teachers are experts in their fields, but also and most importantly, that they understand how people learn. Robotham (1995) further asserts that the achievement of greater self-direction requires the development of a cooperative learning environment

which the learner perceives as being democratic, flexible, challenging and non-threatening. Therefore educators as custodians of the teaching and the learning component, should be conscious of the change in the level of self-direction in learners, and in turn adjust the environment accordingly and not remain static.

Another aspect that needs to be considered before implementing SDL is the assessment policy or broadly speaking, assessment practices. This is in view of the fact that SDL differs from the traditional way of teaching and learning. Therefore it is imperative to have a look at the assessment practices that can be adopted in order to confirm that learning has occurred. Lester (1998:1) states that, if higher education institutions are serious about facilitating self-directed learning, assumptions contained in assessment practices need to be brought into the open where they can be scrutinized and challenged, and models developed which are more aligned to learner managed learning. SDL fosters a deep approach to learning. Assessment practices adopted for self-directed learners should move away from a system that over-emphasises end-of year examinations as the ultimate "ticket" to a qualification. End-of year examinations are associated with a surface approach to learning. Just as students study strategically, so too we should assess strategically, devoting our energies to the most efficient and effective types of assessment for our purposes (Brown and Knight, 1994:36).

Therefore it is important that once SDL is adopted as the teaching and learning strategy, assessment practices should be compatible with the goals of SDL. Assessment practices that encourage self-directed learning include: projects, role playing, computer simulations, portfolios, interactive assessments that are for example computer based, demonstrations, just to mention a few. Assessment practices for SDL should be viewed as part of the learning process and not as an event that would encourage the adoption of surface learning. Many examinations encourage surface learning (Brown and Knight, 1994:67).

In summary, Blackwood (1994) offers ten steps stated as a strategy for successfully incorporating SDL techniques into mandated education and training. The researcher adapted some aspects of the steps for them to be in line with the higher education environment. The steps are stated below:

Educate management: Help management interpret mandates liberally so that the need is met in the most cost-effective way. Ensure support by helping management find out about the theory and

advantages of self-directed learning. Emphasize the optimization of learning and the efficiency of using self-directed learning principles.

Involve learners: Consider strategies that include the learners from the beginning by placing them on the curriculum committee, having them review regulations and requirements and help define the training plan for each learning classification. Further, Taylor and Burgess (1995) advocate that an orientation to SDL is helpful in ensuring that SDL develops. Orientation prepares the learner for an approach to learning, which may be new or may involve changes to established habits and expectations of learning, the authors further assert.

Know the audience: Survey the learners with pointed questions like, what does it take to get this learning process completed? How should a course be designed to help teach this skill or knowledge? Incorporate learner feedback into the training plan. If the learners lack learning skills, or are not ready to learn by self-direction, the first step is to help them acquire these skills.

Obtain learner support: Review the training plan with the learners and the facilitators. Answer any questions and negotiate changes. Learners should be responsible for their own training and learning.

Be a consistent facilitator: Be honest and available. Once the parameters are set do not waver from them. Conti (1989) cited in Blackwood (1994) found that learners responded well academically to teachers who were consistent in their application irrespective of their teaching style.

Use contracts or plans: Use a learning contract at the very beginning of each class. Learning plans that include checklists, procedures, end goals or objectives and adequate materials motivates learners. (Learning contracts are discussed later in this chapter).

Motivate learners: Because of the mandatory nature of some education, learners do not always see what the benefit is to them. Therefore, spend as much time as possible on motivating the learner. Make sure the learner is aware of benefits, which can include taking charge of their own learning, increased self-esteem and mastery of the class material.

Incorporate alternate methods: Prepare alternative means of delivery such as reading, video, one on one mentoring, resource centers and study guides. Give learners choices and options. To optimize SDL, learners need to have learning materials available to them when they want them. Training centers and

resource centers should always be open and adequately staffed. Learning materials should be allowed to leave the learning facilities. Learning materials should be readily accessible for learners to find information with ease.

Build the infrastructure: Know what is mandated, that is what must be included in the training by regulation and set parameters. Arrange a safe and appropriate environment. Build a basic outline of different topics. Gather resource materials and alternate teaching methods and materials. Train yourself by taking courses and learning as much as possible, not only about the topics but also about what to expect from adult learners. Be sure to include plenty of independent practice options for learners to learn at their own pace.

Evaluate: If there is a mandated or standard test at the end, teach to the test. Interpret mandatory evaluation criteria as liberally as possible. Allow learners to choose how they would like to be evaluated whenever possible.

A well-thought-out preparation for the implementation of SDL is critical to its success. If all role players of SDL are well informed about the process and its advantages, the success of its implementation can be guaranteed.

2.9 RESISTANCE TO SELF-DIRECTED LEARNING AND HOW TO OVERCOME IT

Regardless of some resistance, SDL is a reality to be considered in most learning and teaching situations. A reality that those who lag behind must strive to promote. According to Kreber (1998), promoting in students the willingness and capacity to engage in self-directed lifelong learning is a goal of higher education. Resistance to self- directed learning might be found in what Long (1994:35) calls locations of resistance, organizational structures and procedures, educators or trainers as well as learners. The three locations of resistance are discussed below:

- Organizations such as corporations, public schools and higher institutions have a long history of fostering dependent approaches to learning (Long, 1994:31b). Higher education institutions (the main focus of this study) tend to prescribe roles for educators or trainers in order to emphasize the relationships and behaviours that limit learner initiatives such as instructional techniques that emphasize recall, repetition and memorization. When SDL is perceived as "threatening" the above status quo, resistance is bound to occur. An organization designed around passive

learning practices will also be inclined to resist SDL as incompatible with its systems for grading and evaluating student progress (Long, 1994:32b). Still on grades, Fischer and Scharff (1989:52) assert that it is perceived that self-directed learning is not rewarded by grades or diplomas and many people feel that it cannot therefore have any value. However, no matter how true this notion is, a number of people are working at their workplaces without demanding grades. On completion of a course, successful trainees are issued with either certificates of attendances or competency certificates without grades regardless of the learning strategy offered. Therefore the lack of grades (in SDL) cannot be assumed to imply that SDL is of no value.

- Educators and trainers prefer the "tried and tested" teaching and methods. SDL is neither new nor untested (Zemke, 1998:2). Familiar methods are preferred as compared to unfamiliar methods. The lack of knowledge about SDL leads educators and trainers to raise questions concerning their abilities to apply SDL techniques (Long, 1994:32b). SDL can also be perceived as a threat to the educators and trainers' authority. Therefore educators can create barriers to learners assuming personal ownership of their own learning and thereby foster resistance to SDL.

- Learners oppose SDL based on previous learning experiences in which they might have played a passive role in their learning or where "memorization of content" was the norm. Reluctance to depart from past practices might be coupled with the fear of the unknown.

Hiemstra and Brockett (1994) presented some strategies for overcoming resistance to SDL in relation to the three sectors stated above namely, institutions, educators and trainers and learners.

Institutions: It is recommended that those responsible for developing institutional policies need to be willing to think about new and different ways of viewing organizations. An example may be to pay more attention to learner needs, workplace trends for lifelong learners, affording educators the flexibility to align teaching and learning strategies with out of class demands, just to mention a few.

Below are thirteen strategies that can help overcome resistance to SDL by educators or trainers (Hiemstra and Brockett, 1994).

- Teach learners to be self-reflective.
- Develop recognition of rewards for SDL.
- Provide guidelines for organizing and conducting SDL projects.
- Help learners develop skills in using technology.
- Use technology for advisement and learner feedback.
- Help learners learn how to investigate options, opportunities,and resources.
- Help learners learn how to match individual strengths with interest
- Help learners develop education plans.
- Help learners develop good technical learning skills.
- Help learners feel comfortable with new content.
- Help learners enhance their sense of personal learning competence.
- Help learners develop confidence and skill in taking control of elements of teaching-learning transactions (for example, needs assessment, goal setting, selection of content and process and self-evaluation).
- Help learners create and control effective learning environments.

The above strategies form part of the role of the facilitator in helping learners make the transition from teacher control to learner control in SDL. To further elaborate the notion of resistance to engage in SDL teaching and learning strategies, Brockett and Hiemstra (1991) identified ten myths about self-directed learning that have a potential for creating resistance to self-directed learning. The myths are summarized below.

Myth 1: **Self–directed learning is an all or nothing concept**. If viewed as an all or nothing, learners and facilitators alike who do not embrace SDL can be labeled. To overcome this notion, self-direction should be viewed as a continuum where it is viewed as a characteristic that exists to a greater or lesser extent in all persons or situations.

Myth 2: **Self-directed learning implies learning in isolation**. Such a myth can easily lead to educator resistance to promoting SDL and learner resistance to engaging in SDL. This is obviously in view of the fact that learning is viewed as an opportunity to interact with others. Anything interfering with a view of interacting with others is bound to be met with some resistance. SDL does not necessarily imply solitary learning (Candy, 1991:367). The bulk of learning is done individually, but there is time

to meet with peers in order "to compare notes" and with educators to consult. Educators should strive to strike a balance between individual and group learning activities as a way of overcoming resistance.

Myth 3: **Self-directed learning is just another fad.** Put simply, a fad can be anything quickly accepted by a small group of people and gets rejected out just as quickly. SDL took hold some 150 years ago in the United States when early scholars attempted to understand SDL (Hiemstra, 1994a). The author further asserts that for the last three decades self-directed learning has become a major research area. At a European Conference in 1999, a workshop on SDL was held and issues addressed included the nature and concept of SDL itself and inter-cultural understandings of SDL (Atwell, 1999). This is hardly indicative of a fad. There is the potential for misunderstanding and misappropriation of the term based on the fact that SDL has been widely used in the field of education.

Myth 4: **Self-directed learning is not worth the time required to make it work.** The process involved in SDL is unavoidably long, requiring a certain amount of stand up time. Piskurich (1993) asserts that the actual developmental costs of SDL are high because of the developmental time that is long. The process involves the introduction of the learning process, helping learners to diagnose their needs, assessing possible options for the learning process, negotiating about content and outcomes and determining how learning will be evaluated (Brockett and Hiemstra, 1991:14). This process undoubtedly consumes a lot of time, but should not deter potential candidates because the rewards are long-term efficiency in the learning process.

Myth 5: **Self-directed learning activities are limited primarily to reading and writing.** Self-directed learning is not about formal learning alone. Learning any extramural activities also constitutes SDL, for example, how to play a musical instrument. SDL holds much promise for skill and performance-based learning because it stresses an experiential approach to learning, where the learner is an active participant rather than a passive recipient of information (Brockett and Hiemstra, 1991:13).

Myth 6: **Facilitating self-directed learning is an easy way out for teachers.** Self-directed learning involves a deeper commitment from instructors (facilitators) because more energy is required for both individual and group work. It is about principles and practices of self-directed learning being taken seriously. Brockett and Hiemstra (1991:14) quote Hiemstra (1988) who asserts that the teaching-learning transaction in self-direction learning situations is a "learning partnership."

Myth 7: **Self-directed learning is limited primarily to those settings where freedom and democracy prevail**. Most discussions of self-direction focus on situations where the learner consciously chooses to engage in a learning project, and to do so in a self-directed way. A problem arises in situations in which decisions about participation, content, and process lie outside of the individual? While the circumstances that bring such learners to the learning activity are antithetical to the spirit of self-direction, it is inaccurate to suggest that there is no place for principles and practices of self-direction in such situations (Brockett and Hiemstra, 1991:15).

Facilitators can incorporate elements of self-direction into situations where many key decisions, including specific content, are predetermined. The point here is that it is possible even in highly structured learning situations to move towards self-direction by making sure that the learners have control over as many elements of the process as possible (Brockett and Hiemstra, 1991:15). As a way of overcoming resistance to self-direction, it can be argued that self-direction can be viewed as a potential strategy for helping facilitators work with learners who may be resistant because of resentment toward the circumstances that led them to the learning activity.

Myth 8: **Self-direction in learning is limited primarily to white, middle-class adults.** A criticism that is sometimes leveled at self-direction in learning is that it is merely a reflection of mainstream values in the society, and thus has little to offer learners who have traditionally been marginalized or disempowered, such as women and minorities (Brockett and Hiemstra, 1991:15). There is an extensive body of research showing that self-direction in learning is a phenomenon that can be found in all strata of society. The two examples below are an illustration of two different categories, one from "middle" class adults and the other from "lower" class adults: In a preliminary study titled "Entrepreneurs as self-directed learners" Guglielmino and Klatt (1993) found that successful entrepreneurs developed a high degree of self-managed or self-directed learning readiness as measured by the self-directed learning readiness scale.

Rowland and Volet (1996:1) in a study titled, "Self-direction in community learning: a case study", respondents were taking courses in arts or crafts or skills related to home, health or leisure. The findings were in favour of self-directed learning. A comment from one of the respondents on being

asked about learning the self-directed way responded by saying, "it felt homelike, not institutional." These two are just examples to indicate that self-direction in learning is not limited primarily to white, middle-class adults. Brockett (1994:15) echoes the following: I have been convinced for more than a decade that self-direction holds tremendous potential for reaching those who have been traditionally labeled "hard-to-reach" adults. Its great advantage is that it provides a different approach for working with learners who have rejected more traditional approaches to education due to such factors as rejection, frustration or boredom, here the author is referring to lower social classes of society.

Myth 9: **Self-directed learning will erode the quality of institutional programs.** Wilcox (1996) advocates that the university's first obligation is to develop, maintain and promote standards of excellence in academic achievement and professional training. This obligation applies to other institutions of higher education. Turning greater responsibility for the learning process over to learners is analogous to letting go of control over quality of programs. Self-direction principles can be misused in a way that will, in fact, compromise program quality. It is not self-direction itself that raises quality issues, quality declines only when self-direction is improperly implemented. Educators can make use of research and practice literature that addresses ways to successfully incorporate self-direction into various learning settings. Institutions will always strive to uphold high standards and quality in order to safeguard their integrity. There is no way that institutions of higher learning can abdicate their roles of ensuring that programmes are run according to certain set standards. Facilitators can act as mediators to bring about a better balance between the learner and the institution in an attempt to uphold standards bearing in mind that the facilitators are aware of the institutional standards, and have the autonomy and support they require to effectively "administer" SDL to their fullest capacity.

Myth 10: **Self-directed learning is the best approach for adults**. The final myth that can lead to resistance toward self-direction is one that can actually be promoted by those who actively advocate self-direction, but do so in an uncritical way (Brockett and Hiemstra, 1991:16). In their enthusiasm to embrace an approach that clearly holds much promise, some educators may take the extreme position that self-direction is the best, indeed, the only effective way for adults to learn. Students do elicit different learning styles and preferences that affect the way they learn. Educators of adults need to recognize the vast array of approaches and philosophies available to work successfully with adult learners and to recognize the inherent limitations of any approach (Brockett and Hiemstra, 1991:16).

The impact of SDL has a potential to be advocated as the single best theory, method, or approach to adult learning thus ignoring differences in learning styles, teaching styles and institutional policies. Presenting self-direction as a panacea is clearly a way to promote resistance among those who might otherwise be open to incorporating elements of the approach into their practice (Brockett and Hiemstra, 1991:16).

For greater achievements of SDL, learners, educators and institutions are required to have a clear understanding of the rationale, processes and a commitment to make it work. Of note is that there is almost always initial resistance to SDL or any new learning strategy that threatens the traditional way of doing things. The transition from traditional methods to SDL can be understandably difficult. However, Brockett and Hiemstra (1991:6) advocate that many leading organizations are discovering that SDL offers a means of remaining competitive in an era of change.

Resistance to the introduction of SDL emanates mostly from three sectors namely, organizational or institutional structures and procedures, educators or trainers and learners. The three sectors are interfaced as advocated by Brockett and Hiemstra (1991). Institutional policies (structures and procedures) that resist opportunities for self-direction can be adopted uncritically by instructors. In turn, learners who have never been encouraged to take responsibility for their own learning can remain unaware of the power they possess as learners. On the other hand instructors may expect students to take responsibility for their own learning, yet at the same time limit the students' ability to do so by retaining their institutionalized right to hold final decision-making powers in their own hands, and therefore not committing to self-directed learning (Wilcox, 1996).

It would be inherently unwise to step into some vast unknown in order to improve teaching and learning. On the other hand one needs to be active in the quest to recognize the potential for good ideas and be willing to challenge the educational status quo by trying new teaching and learning strategies. According to Hiemstra (1994) the process of providing opportunities for learners to assume some control of their learning is as important as the actual content being covered in a learning effort. The institution and educators can foster SDL by providing opportunities for students' self-growth based on the benefits of SDL on the short and long-term basis, that is, responsible lifelong learners. Wilcox (1996:14) is of the opinion that if an institution does not reflect the ethics of caring that promote SDL, it is difficult, perhaps impossible, to implement it within that institution.

In concluding this chapter, it should be stated once more that the purpose of the literature review of this study was to conceptualise SDL as a teaching and learning strategy. What emerged is the vast information with regard to SDL. The definition of SDL assumes different meanings based on the context in which it is perceived. Concerns have been raised about the resistance to engage in SDL activities. However, Hiemstra (1994) made attempts to curb the misconceptions (myths) about this widely researched teaching and learning strategy.

What has also emerged in this chapter is that SDL can influence the teaching and learning process in institutional settings. Furthermore, SDL can benefit the learner in preparation for lifelong learning and the world of work. Factors that influence the propensity for learners to be engaged in SDL activities were also briefly discussed in order to highlight the possible influences on the findings of this study. The literature review on the self-directed learner has brought to the fore important aspects about the characteristics of the self-directed learner. From the information presented in this chapter, it should be stated that the knowledge base relating to SDL was useful in understanding the concept of SDL.

In chapter 3, the research design and methodology adopted for this study will be addressed. The scale (SDLRS) used for the collection of the research data will be covered in more detail in chapter 3.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the research design and methodology adopted for this study. The purpose of this study was to assess the readiness of National Diploma Radiography: Diagnostic students to engage in SDL. The notion of readiness and the concept of autonomy have been studied and discussed most often in the professional literature on SDL, as a personal attribute (Merriam and Caffarella 1991:216). An expanded number of thoughtful and insightful publications in the field of SDL have been completed in the last few years (Caffarella 1993), and the number is still increasing. Of note is the development of the Self-Directed Readiness Scale by Guglielmino in 1977. Hiemstra (1994:2) states that another important research effort was Guglielmino's (1977) dissertation in which the Self-Directed Learning Readiness Scale (SDLRS) was developed, an instrument subsequently used by many researchers to measure SDL readiness or to compare various aspects (see 1.7.2.1) with numerous characteristics. The SDLRS was utilised for this study to determine the level at which students are ready for SDL in the National Diploma Radiography: Diagnostics.

3.2 RESEARCH DESIGN

A descriptive survey assuming a quantitative method was adopted for this study. Descriptive surveys are the first and elementary levels of research activities. They are of major importance for understanding and accumulating knowledge. According to Bell (1993:14) surveys can provide answers to the questions, what, where, when, and how?

Surveys are based on the fact that it is not possible to collect data from everyone who falls into the category being researched. As a result, surveys rely on getting evidence from a portion of the whole in the expectation and hope that what is found in that portion applies equally to the rest of the "population" (Denscombe, 1998:11). All respondents are asked the same questions as far as possible, and under the same circumstances (Bell, 1993:14).

The SDLRS was used as a survey instrument to obtain responses from the first, second and third year National Diploma Radiography: Diagnostics students at the TWR. The responses were used to obtain information about the level at which students are ready to engage in SDL with a view of establishing the level at which it is feasible to implement SDL in the National Diploma Radiography: Diagnostics at the TWR, or any other institution training diagnostic radiography students.

3.3 RESEARCH METHODOLOGY

Research methodology focuses on the research process, the kind of tools and the procedures to be used (Mouton, 2001). The sampling method, data collection instrument and the procedure followed to acquire responses are addressed and discussed in more detail in the paragraphs below.

3.3.1 Sampling

The participants in this study comprised a purposive sample of students registered for the Radiography Diploma programme at TWR in 2003. In purposive sampling, researchers handpick cases to be included in the sample on the basis of their judgment of typicality (Cohen, Manion and Morrison, 2000:103). The authors further assert that in this type of sampling, the sample is chosen for a specific purpose that might indicate most distinctively the factors that are being investigated. Denscombe (1998:15) advocates that the purposive type of sampling is applied to situations where the researcher already knows something about the specific people or events, and deliberately selects those particular ones because they are seen as instances that are likely to produce the most valuable data.

The TWR from which the sample was taken, is one of the eight accredited institutions of higher learning in South Africa offering the diagnostic radiography programme. Universities offer degrees whilst technikons offer diplomas. Both programmes are offered over three years. Techikons put more emphasis on the world of work. The researcher assumes that the chosen group of students might indicate, most distinctly, the level at which students are ready to engage in SDL in the diagnostic radiography programme. The students were chosen in view of the fact that they are conveniently, located and the researcher has a fair understanding of who the students are. The researcher also believes that the students are likely to produce valuable data because the chosen students are relevant for this study and the topic under investigation. The students are all registered for the National Diploma Radiography: Diagnostics and are the researcher's target group. Further the students are relevant for this study in view of the fact that the SDLRS was designed for tertiary institutions ' students and all

participants were assessed as qualifying to study radiography at the TWR. All participants met the matriculation requirements and wrote a Department of Radiography specific selection test that was followed by an interview when they applied to train as diagnostic radiographers.

Greenfield (2002:189) states that the success of purposive sampling depends on two assumptions, namely;

- The research can identify, in advance, the characteristics that collectively capture all variation.
- The chosen sample will correctly reflect the distributions of the characteristics.

Further, Greenfield (2002:189) asserts that, two factors likely to cause contravention of the above assumptions are imperfect knowledge of the population structure and prejudice selection. The researcher acknowledges that each training institution uses different teaching and learning methods. Collating information about teaching and learning strategies from other institutions would have been an enormous task because the institutions are spread throughout the country. There are also vast differences in the number of student intakes between training institutions in South Africa. This was the basis for excluding students from other institutions from this study.

3.3.2 Data collection instrument

According to Mouton (2001:102), data gathering instruments either already exist or are designed and constructed by individual researchers. For this study, an existing data-gathering instrument was used named the Self-Directed Learning Readiness Scale (SDLRS). According to Mouton (2001) the advantage of using an already existing measuring instrument is that it saves time and money. Further, Mouton (2001) cites Mouton, (1996) who advocates that validity and reliability are the least of worries for the researcher if one believes that the validity and reliability of the instrument is high. However, Mouton (2001:102) asserts that, it is essential that information is available about the construct validity and reliability of the existing instrument. Reliability and validity of the SDRLS are covered later in this chapter.

3.3.2.1 The Self-Directed Learning Readiness Scale

The SDLRS was developed by Guglielmino for her doctoral dissertation at the University of Georgia in 1977 (Beitler, 2000:2). The SDLRS consists of 58 items consisting of five response Likert scale type questions. The SDLRS is supposed to measure the degree to which people perceive themselves as having the skills and attitudes typically associated with self-directed learning (Seabrook, 2000:3). A Likert (named for its creator) scale type questionnaire states the issue or opinion and obtains the respondent's degree of agreement or disagreement (Alreck and Settle, 1985),

The SDLRS yields one total score ranging from 58 to 290 that can then be interpreted against a norm (see 4.2.4). Attitudes, values and abilities relating to students' readiness in SDL at the time of responses are measured.

In completing the questionnaire, individuals respond to a range of statements concerning how they approach learning tasks, indicating how often that particular statement could be said to be true to themselves (Robotham, 1995:4). Responses are based on the scale graded as almost always true, usually true, sometimes true, usually not true and almost never true, with 41 of the items positively phrased and 17 negatively phrased (Delahaye and Choy, 2002:1). Readiness to self-direction in learning is assessed as a total score which is then converted into bands of "high", "above average", "average", "below average" and "low" readiness (see table 4.7). These bands give an indication of the extent to which one is self-directed or not.

3.3.2.2 Reliability and validity of the instrument

Whatever procedure for collecting data is selected, it should always be examined critically to assess to what extent it is likely to be reliable and valid (Bell, 1993:103). "A number of studies have provided evidence of the reliability and the validity of the SDLRS" (Guglielmino and Klatt, 1993:3).

Reliability. According to Richardson (1996) the fundamental requirement of a research instrument is that it should be reliable in the sense that it yields consistent results when used repeatedly under the same conditions, and is not vulnerable to errors of measurement. Reliability means the freedom from random error (Alreck and Settle, 1985:64). The most fundamental test of reliability is "repeat-ability" the authors further assert. Hussey and Hussey (1997) are of the opinion that if a research finding can be repeated, it is reliable. The repeatability of the test implies that the same findings are achieved from

both tests. If chance has nothing to do with both findings, one can conclude that the measuring instrument is perfectly reliable.

There are three common ways of estimating the reliability of responses to questions in questionnaires or interviews, these are, the test-retest method, the split-halves method and the internal consistency method (Hussey and Hussey 1997). The reliability and validity of the SDLRS was summarized below, based on a review by Delahaye and Choy (2002).

- **Test-retest** refers to administering the same test some time after the first. In a review by Delahaye and Choy (2002), it is reported that Finestone (1984) and Wiley (1981) noted values of 0,82 and 0,79 respectively for the SDLRS.

Spartz (2001:96) is of the opinion that high correlation coefficients mean lots of agreements and therefore high reliability and low coefficients mean lots of disagreements and therefore low reliability. The author further maintains that the rule of thumb is that an r of 0,80 or higher is expected for social science measurement, where r is the correlation coefficient and indicates the degree of agreement between the test retest scores.

With **internal consistency,** every item is correlated with every other item across the entire sample and the average inter-item correlation is taken as the index of reliability (Hussey and Hussey 1997). The items should "hang together as a set" and be capable of independent measures of the same concept so that the respondents attach the same overall meaning to each other (Cavana, Delahaye and Sekaran, 2000:211).

- Studies to establish internal consistency of the SDLRS demonstrated satisfaction to excellent levels with coefficient alpha and split-half between 0,67 and 0,96. Delahaye and Choy (2002) cite Brockett (1985); Delahaye and Smith (1995); Finestone (1984); Graeve (1987); Guglielmino (1977), (1989); Hall-Johnsen (1981); Hassan (1981) and Skaggs (1981).

Cavana, Delahaye and Sekaran (2000:211) assert that "the higher the coefficients, the better the measuring instrument." Reliability is necessary but it is an insufficient condition of the test for the goodness of a measure (Cavana, Delahaye and Sekaran, 2000). An instrument can be very reliable,

establishing high stability and consistency, but may not be the concept that is set out to be measured. Validity ensures the ability of a scale to measure the intended concept.

Validity. According to Sue, Sue and Sue (1994:102), validity is the extent to which a test or procedure actually performs the function that it was intended to perform.

Delahaye and Choy (2002) reviewed the validity of the SDLRS under the headings stated below.

- The **content** validity of the instrument was established by Guglielmino (1977) by using a modified Delphi technique, with a panel of experts, with three rounds of surveys. Finestone (1984) found a clear congruence between Guglielmino's original Delphi results and an extensive review of available literature on self-directed learning.

The Delphi technique establishes basically the degree to which the survey instrument is judged by experts to represent what it is meant to measure based on the content of the scale. To demonstrate this content validity the instrument must show that it fairly and comprehensively covers the domain or items that it purports to cover (Cohen, Manion and Morrison, 2000:110).

Construct: Delahaye and Smith (1995) cite Christian (1982) who asserts that as only a total score is used in the instrument, convergent validity has been found with andragogy (adult learners) in the Student's Orientation Questionnaire with a value of 0,35 (p=0,01)

- Long and Agyekum (1984) also found support for divergent validity. Posner (1989) reported convergent validity ($p<0,01$) with several constructs, including: preference for challenge (0,81), curiosity for learning (0,79), perceived scholastic competence (0,69), use of internal criteria for evaluation (0,64), independent mastery (0,56), and independent judgement (0,54). Russell (1988) provides support for divergent validity with an inverse linear relationship on preference for structure ($r=0,31$, $p<0,03$).

McCune, Guglielmino and Garcia (1990) also found support for both convergent and divergent validity.

- **Criterion-related.** Hall-Johnsen (1981) and Hassan (1981) found significant positive correlation with learning projects undertaken, and Graeve (1987) reported significant positive relationships with hours spent on self-directed learning. Jones (1989) found a significant positive relationship with observable student behaviours related to self-directed learning readiness.

The application of the instrument has not superseded controversy. Field (1989) analysed the validity and reliability of the SDLRS and concluded that the scale as an indicator of readiness to SDL is not justified because it is without appropriate validation and is methodologically flawed. Guglielmino and McCune (1989) cited in Hiemstra (1994) acknowledge that some limitations of the SDLRS exist. Furthermore, Merriam and Cafarrella, (1991:217) state that, Guglielmino, Long and McCune (1989), dismissed most of Field's arguments due to the "errors of omission and commission" in Field's research and have criticised Field's analysis of the SDLRS based on incorrect interpretation of sources cited, the limited nature of his subject pool for a study of this type and the statistical procedures used. Merriam and Cafarrella (1991:217) advocate that further studies on the SDLRS will put to rest these major differences of opinion. Nonetheless, the instrument helps to better understand aspects of SDL. With the exception of Field (1989) the body of research concerning the validity and reliability of the SDLRS has been supportive of the scale's validity and reliability (Long 1991:12).

3.3.2.3 Justification for adopting the Self-Directed Learning Readiness Scale

The SDLRS is used to assess the readiness for SDL. Guglielmino and Murdick (1997:3) cite McCune (1988) who advocates that the SDLRS has become the most widely used instrument for the assessment of readiness for SDL. The instrument can be used with acceptable confidence to provide an accurate measurement of readiness for SDL (Guglielmino and Guglielmino, 1991). Another instrument developed to measure self-directed learning readiness is the Oddi Continuing Learning Inventory (OCLI). The SDLRS is the more appropriate of the two instruments available to measure readiness to self-direction in adults (Brockett and Hiemstra, 1991).

Guglielmino and Associates (2004:1) advocate the following regarding the SDLRS.

- The scale has been translated into twelve languages, namely, Spanish, French, German, Italian, Korean, Chinese, Japanese, Finnish, Greek, Portuguese, Afrikaans and Lithuanian.
- The SDLRS has been used by more than 500 major organizations around the world.
- More than 40, 000 adults and 5, 000 children have taken the SDLRS.
- More than 90 doctoral dissertations have been completed using the SDLRS.
- A large number of masters' theses have also used the SLDRS.

Furthermore, McCune, Guglielmino and Garcia (1990) advocate that the SDLRS measures constructs such as:

- love for learning;
- self concept as an effective independent learner;
- tolerance of risk;
- ambiguity and the complexity in learning creativity;
- view of learning as a lifelong beneficial process;
- initiative in learning;
- self-understanding and
- acceptance of responsibility for one's own learning.

The above constructs are also referred to as the eight factors underlying SDL readiness within the 58 items in the SDLRS (Seabrook, 2000). According to Merriam and Cafarrella (1991), Guglielmino (1977) states that people must possess the eight factors to be considered ready to pursue SDL.

3.3.3 Method of data collection

Before data collection, the researcher informed the respondents about the following:

- The purpose of the exercise based on what Guglielmino and Associates recommend (see appendix 5).
- The consent to administer the scale was obtained from the TWR's Vice Chancellor Academic.

- Students were free to choose not to participate without fear of victimization because completing the questionnaire was not compulsory.
- Students were reassured about confidentiality, and were offered the opportunity to remain anonymous.
- The availability of the thesis for their perusal on completion, should they wish to do so.

Data was collected from 133 students enrolled for the National Diploma Radiography: Diagnostics at the TWR in 2003. Each student in the first, second and third year was handed the self-completion questionnaire. Questionnaires were handed to students when they came to the TWR for lecture blocks between August and September. Completion of the questionnaires was done during the class time of each group. All students present in class at the time of the distribution of the questionnaires willingly completed the questionnaire. The questionnaires were collected immediately after completion. Each student was allocated a unique number for purposes of data analysis. Numbers were not linked to any name, age or gender. For this study, requests for certain personal data such as age, gender and year of study were completed in order to provide an overview of the role played by age and gender in SDL. However, Delahaye and Smith (1995) discovered that the instrument was not affected by gender or by level of tertiary education.

The developers of the scale's administration recommendations were adhered to and are the following:

- Allowing the respondents as much time as they need to complete the SDLRS (completing the SDLRS usually requires about thirty minutes).
- Not informing respondents of the exact purpose of the SDLRS. (This is necessary to avoid possible response bias).
- Only stating the instructions provided with the SDLRS. (see appendix 5).

The rest of the information given concerned answering of questionnaires. Most students took approximately fifteen minutes to complete the questionnaire with the balance completing it within twenty minutes.

3.3.4 Data processing and analysis

The Statistical Package for Social Sciences (SPSS) was used to analyse data. The respondents were classified as SDR for 1st year, SDRR for 2nd year and SDRRR for 3rd year. For the purpose of this study, SDR stands for Student Diploma Radiography. The number of Rs denoted the year of study.

Descriptive statistics were used to describe the data and presented in tables. "Descriptive statistics produce a number or a figure that summarizes or describes a set of data" (Spatz, 2001:2). Comparisons between the class levels (first, second and third year students) based on responses were done. Total scores for each respondent in each class were tallied based on those who were self-directed and those who were not. These were then compared to each class of students to ascertain which class had the most number of self-directed students, based on the mean score of each class level. In that way, it was possible to establish the level at which most students in the Radiography Diploma programme were ready for SDL.

Guglielmino and Associates calculated the individual scores (tables 4.1-4.3) based on the unique numbers (4.2.1) provided by the researcher. Statkon at the Rand Afrikans University did all statistical manipulations and analyses, except tables 4.5-4.7 and figures 4.1-4.2. The researcher did these, as additional information the researcher felt was necessary for interpretation. The results obtained with the methods of data analysis are presented, described and discussed in chapter 4.

3.3.5 Summary

None of the participants had any difficulties in completing the scale or following the scoring procedure. This was expected because the scale should not pose any difficulties for tertiary students (see 1.7.2.1). All students completed the scale within the recommended time of thirty minutes.

CHAPTER 4

PRESENTATION AND ANALYSIS OF RESULTS

4.1 INTRODUCTION

The purpose of this study was to establish the level at which most students in the National Diploma Radiography: Diagnostic programme at the TWR were ready to engage in SDL. Data about the self-directedness for first, second and third year students at the TWR was obtained using questionnaires. The SDLRS (questionnaire) was used as the instrument to collect information to measure the students' readiness to engage in SDL.

4.2 PRESENTATION OF DATA

In this chapter, the collected data and analysis thereof are presented. Tables and graphs are used to enable patterns and relationships not clear in the raw data to be discerned as a way of analyzing the obtained data.

4.2.1 Allocation of unique numbers

As stated in chapter 3, anonymity was exercised in the identity of respondents. Each student (respondent) was allocated a unique number linked to the year of study. The unique numbers had a common code, for each year of study, Student Diploma Radiographer (SDR), a single R for first years, double Rs (SDRR) for second years and triple Rs (SDRRR) for third years. Thereafter based on the year of study, each student respondent was allocated a unique number from AA through to AZ then BA through to BY (51 respondents, Table 4.2) for first year students. The thirty-six second years were allocated unique numbers from AA through to AZ as well, then BA through to AJ (Table 4.3). Third year student respondents (46) were allocated the same AA through to AZ as the first and second year students followed by BA through to BT (Table 4.4).

4.2.2 Response rate

According to Alreck and Settle (1985:419), response rate is the percentage of those included in the sample who respond to the survey and provide usable, completed questionnaires. For this study, 160 students were identified who satisfied the inclusion criteria (full-time registered students for the

Radiography Diploma at the TWR for the year 2003) for the target population. In first year, there were 62 students, second year, 40 students and in third year 58 students. However, only 133 students were able to complete the questionnaires. On completion, all the questionnaires were collected. First year students who completed the questionnaires were 51, second years 36, and third years 46. Students who did not complete the questionnaires were absent in class at the time of the administration of the SDLRS. The researcher did not follow up on those who did not complete the questionnaires in view of the fact that those who had already completed the questionnaires might have discussed the contents of the questionnaires with fellow students, resulting in response bias. The response rates are summarized in the table below (Table 4.1).

TABLE 4.1 SUMMARY OF THE RESPONSE RATE.

Study year	Total in class	Number of respondents	% of respondents	Non respondents	% of non respondents
First	62	51	82	11	18
Second	40	36	90	4	10
Third	58	46	79	12	21
All groups	160	133	83	27	17

The non-respondents, 18%, 10% and 21% in first, second and third years respectively, did not attend class either due to illness or absence. Absenteeism had no influence on the administration of the questionnaire because none of the students had any prior knowledge of their pending completion of the questionnaires. Only the lecturers knew of the planned times of the administration of the questionnaires. The time slots were considered convenient for both lecturers and students. The response rates for the first, second and third year students were representative of the target population and as such the respondent rates were considered sufficient for conclusions to be drawn.

4.2.3 Presentation of raw data

The responses are presented in tables according to students' year of study. Responses include the SDL readiness scores, gender and age. The response data scores for the first, second and third year students are presented below in tables 4.2, 4.3 and 4.4 respectively.

TABLE 4.2 DISTRIBUTION OF INDIVIDUAL SELF-DIRECTED LEARNING READINESS SCALE SCORES FOR FIRST YEAR STUDENTS

Number of students	Student's unique number	Individual scores	Gender	Age in years
1	SDRAA	222	F	19
2	SDRAB	250	M	20
3	SDRAC	205	F	18
4	SDRAD	224	F	18
5	SDRAE	207	F	20
6	SDRAF	239	M	21
7	SDRAG	224	F	18
8	SDRAH	215	F	18
9	SDRAI	210	M	18
10	SDRAJ	207	M	21
11	SDRAK	227	F	19
12	SDRAL	210	M	19
13	SDRAM	209	M	19
14	SDRAN	176	F	20
15	SDRAO	160	F	18
16	SDRAP	203	F	20
17	SDRAQ	267	F	21
18	SDRAR	201	M	19
19	SDRAS	216	F	18
20	SDRAT	255	F	36
21	SDRAU	263	M	35
22	SDRAV	204	M	20
23	SDRAW	195	F	19
24	SDRAX	205	M	21
25	SDRAY	197	F	18
26	SDRAZ	234	M	30
27	SDRBA	237	F	18
28	SDRBB	200	M	20
29	SDRBC	252	F	20
30	SDRBD	246	M	19
31	SDRBE	230	M	20
32	SDRBF	255	F	20
33	SDRBG	253	F	21
34	SDRBH	191	F	19
35	SDRBI	230	F	20
36	SDRBJ	239	M	20
37	SDRBK	209	F	21
38	SDRBL	219	F	40
39	SDRBM	209	M	20
40	SDRBN	202	F	17
41	SDRBO	192	M	26
42	SDRBP	207	M	18
43	SDRBQ	169	M	18
44	SDRBR	203	F	22
45	SDRBS	176	M	37
46	SDRBT	226	M	22
47	SDRBU	250	F	21
48	SDRBV	233	F	24
49	SDRBW	190	F	19
50	SDRBX	214	F	20
51	SDRBY	258	M	20

Table 4.2 represents the individual SDLRS scores of the 51 first year students. Both the age and gender of the first year students were also presented in this table. In column two, the unique number for each student was presented.

TABLE 4.3 DISTRIBUTIONS OF INDIVIDUAL SELF-DIRECTED LEARNING READINESS SCALE SCORES FOR SECOND YEAR STUDENTS

Number of students	Student's unique number	Individual scores	Gender	Age in years
1	SDRRAA	157	F	21
2	SDRRAB	171	F	21
3	SDRRAC	158	F	19
4	SDRRAD	216	M	23
5	SDRRAE	220	F	20
6	SDRRAF	192	F	50
7	SDRRAG	211	F	21
8	SDRRAH	214	F	21
9	SDRRAI	176	F	19
10	SDRRAJ	225	F	20
11	SDRRAK	212	F	22
12	SDRRAL	195	F	20
13	SDRRAM	196	F	20
14	SDRRAN	208	F	21
15	SDRRAO	255	M	20
16	SDRRAP	210	F	21
17	SDRRAQ	199	F	20
18	SDRRAR	187	F	20
19	SDRRAS	211	F	20
20	SDRRAT	197	F	23
21	SDRRAU	190	F	20
22	SDRRAV	250	F	20
23	SDRRAW	211	F	20
24	SDRRAX	212	F	19
25	SDRRAY	188	F	19
26	SDRRAZ	244	F	19
27	SDRRBA	235	F	19
28	SDRRBB	197	F	20
29	SDRRBC	145	F	20
30	SDRRBD	194	F	19
31	SDRRBE	205	M	21
32	SDRRBF	242	F	21
33	SDRRBG	228	M	25
34	SDRRBH	191	F	29
35	SDRRBI	180	M	23
36	SDRRBJ	230	M	32

Table 4.3 represents the individual SDLRS scores of the 36 second year students. Both the age and gender of the second year students were also presented in this table. In column two, the unique number for each student was presented.

TABLE 4.4 DISTRIBUTION OF INDIVIDUAL SELF-DIRECTED LEARNING READINESS SCALE SCORES FOR THIRD YEAR STUDENTS

Number of students	Student's unique number	Individual scores	Gender	Age
1	SDRRRAA	222	F	20
2	SDRRRAB	231	F	40
3	SDRRRAC	204	M	22
4	SDRRRAD	204	M	21
5	SDRRRAE	224	F	21
6	SDRRRAF	238	F	21
7	SDRRRAG	238	M	21
8	SDRRRAH	205	F	22
9	SDRRRAI	202	F	22
10	SDRRRAJ	181	M	25
11	SDRARRK	201	F	25
12	SDRRRAL	215	M	22
13	SDRRRAM	166	M	24
14	SDRRRAN	200	F	22
15	SDRRRAO	209	F	23
16	SDRRRAP	171	F	22
17	SDRRRAQ	172	F	23
18	SDRRRAR	185	F	20
19	SDRRRAS	231	M	23
20	SDRRRAT	211	M	23
21	SDRRRAU	209	M	24
22	SDRRRAV	194	M	21
23	SDRRRAW	220	M	21
24	SDRRRAX	192	M	25
25	SDRRRAY	239	F	22
26	SDRRRAZ	238	F	42
27	SDRRRBA	204	M	25
28	SDRRRBB	160	F	21
29	SDRRRBC	183	M	26
30	SDRRRBD	173	F	23
31	SDRRRBE	196	F	21
32	SDRRRBF	184	F	22
33	SDRRRBG	194	F	21
34	SDRRRBH	227	F	20
35	SDRRRBI	182	F	27
36	SDRRRBJ	191	F	21
37	SDRRRBK	218	F	21
38	SDRRRBL	197	M	20
39	SDRRRBM	171	F	23
40	SDRRRBN	218	F	24
41	SDRRRBO	199	M	24
42	SDRRRBP	209	F	22
43	SDRRRBQ	226	F	21
44	SDRRRBR	185	F	21
45	SDRRRBS	232	M	24
46	SDRRRBT	212	M	34

Table 4.4 represents the individual SDLRS scores of the 46 third year students. Both the age and gender of the third year students were also presented in this table. In column two, the unique number for each student was presented.

The response data presented in tables 4.2, 4.3 and 4.4 were used for statistical analysis in search of what the responses meant, and in finding answers to the questions posed in chapter 1. All the statistical analyses that follow were done using data in tables 4.2-4.4.

4.2.3.1 Demographic data

Demographic data consists of information such as age, educational level, gender, marital status and income. The first three were the only ones relevant for this study. The respondents were all registered students of the TWR for the year 2003. Demographic information was required to help describe the sample characteristics while presenting and analyzing data. The relevant demographic data is presented in tables 4.5 and 4.6.

TABLE 4.5 FREQUENCIES FOR AGE DISTRIBUTION ACCORDING TO STUDENTS' YEARS OF STUDY.

Study year	Minimum	Maximum	Mean
1st year	17	40	21.5
2nd year	19	50	21.9
3rd year	20	42	23.5

The age distribution of the different groups illustrated that most of the younger students were from the first year group with a mean of 21.5 years, and older students were mostly from the third year group with a mean of 23.5 years. The older students in each group are students who have been working either in the profession as supplementary radiographers (radiography certificate awarded after one of training) and were improving their qualifications to diploma level, or were students who have been working in other fields.

TABLE 4.6 FREQUENCY OF GENDER DISTRIBUTION ACCORDING TO STUDENTS' YEARS OF STUDY.

Study year	Females	Males	% Female	% Male
First	29	22	57	43
Second	30	6	83	17
Third	28	18	61	39
Totals	87	46	65	35

As indicated by data in table 4.6, the majority of respondents were females, 57%, 83% and 65% in first, second and third year respectively. In the radiography profession it is a known fact that females dominate in number as compared to males. The majority of respondents were females.

4.2.4 Self-Directed Learning Readiness Scale scoring ranges

The SDLRS yields one total score ranging from 176 to 290 that can be interpreted against a norm (Studies in Higher Education, 1998). According to Beitler (2000) the average score for adults who complete the SDLRS is 214 (with a standard deviation of 25.59). Furthermore, Beitler (2000) provides scoring ranges for adults on the SDLRS (see table 4.7).

TABLE 4.7 SCORING RANGES FOR THE SELF-DIRECTED LEARNING READINESS SCALE

Low	**58-176**
Below average	**177-201**
Average	**202-226**
Above average	**227-251**
High	**252-290**

Beitler (2000) interprets the scoring ranges stated above as follows:

- Persons with low or below average SDLRS scores usually prefer very structured learning options such as lectures in a traditional classroom setting. Beitler (2000) refers to this as face-to-face classroom settings. Persons with low or below average SDLRS scores will require a large amount of time commitment from the facilitator.
- Persons with average SDLRS scores are likely to be successful in more independent situations, but are not fully comfortable with handling the entire process of identifying their learning needs, planning their learning and then implementing their learning plans.
- Persons with above average or high SDLRS scores usually prefer to determine their own learning needs, plan their learning and then implement their learning plans. They are better prepared to be self-directed and require minimum guidance.

The SDLRS scoring ranges stated above can be of benefit in determining the extent to which students can be classified in terms of those requiring guidance or not in their learning. Furthermore the facilitator can determine where most of his or her time commitment in teaching can be directed. Beitler (2000) cautions though, that persons with above average or higher SDLRS scores may choose structured learning such as traditional courses or workshops as part of their learning. Therefore, assuming that persons with higher SDLRS scores do not require guidance in their learning, might be an

omission on the part of the facilitator who might conclude that such persons do not require guidance based on their SDLRS scores. Nonetheless, a high SDLRS total score indicates a high level of readiness for SDL and on the other end, a low SDLRS total score indicates a low level of readiness for SDL

4.3 ANALYSIS OF THE SELF-DIRECTED LEARNING READINESS SCALE SCORES OF THE RESPONDENTS

Data from responses was analysed using the Statistical Package for the Social Sciences (SPSS) version 11.01. This software was used to describe, summarise and analyse the quantitative data collected. Packages such as the SPSS enable researchers to conduct a wide range of analysis, carry out statistical tests quickly, accurately and to present the results in the form of tables and charts (Hussey and Hussey, 1997). For this study, tables were drawn to depict the inter-group comparison, followed by a discussion of emerging trends. Microsoft Exel was also used as a quick tool in the calculation of totals, and the sorting out of data in ascending and descending order depending on the need.

4.3.1 Statistical analysis for the individual groups

According to Hussey and Hussey (1997) descriptive statistics involve transformation of raw data into a form that would provide information to describe a set of factors in a situation. This is done through the ordering and manipulation of raw data. The raw data in this study include the SDLRS scores and the students' gender and ages. Frequency distributions, measures of central tendencies (means, medians and modes) and dispersion (spread) of variables (age and gender) for all students and individual groups (year of study) were presented. Where appropriate, comparisons of responses based on the SDLRS scores were made using one-way ANOVA (analysis of variance) taking $p<0.05$ as significant. In addition, the correlation between the SDLRS and age as well as the SDLRS and gender were obtained using the t-test also with $p<0,05$ considered significant. Tests for normality and t-tests were also used to analyze data.

4.3.1.1 Descriptive statistics for group levels

All respondents were National Diploma Radiography: Diagnostics students. The first group of respondents comprised of first year students totaling 51 (table 4.8). The second group of respondents

comprised of second year students totaling 36 (table 4.9) and the third year group of students amounted to 46 (table 4.10). In tables 4.8-4.10 some descriptive statistics are presented for the SDLRS score and age for the three groups of students.

TABLE 4.8 DESCRIPTIVE STATISTICS FOR THE FIRST YEAR GROUP

	SDLRS SCORE	AGE IN YEARS
N	51	51
Range	107	23
Mean	**217.94**	**21.27**
Median	**214**	**20**
Mode	**207**	**20**
Minimum	**160**	**17**
Maximum	**267**	**40**
Std. Deviation	25.016	5.131
Skewness	.013	2.532

From table 4.8, the 51 first year students' minimum and maximum SDLRS scores were 160 and 267 respectively with a standard deviation of 25.016.

TABLE 4.9 DESCRIPTIVE STATISTICS FOR THE SECOND YEAR GROUP

	SDLRS SCORE	AGE IN YEARS
N	36	36
Range	110	31
Mean	**204.22**	**21.89**
Median	**206.50**	**20**
Mode	**211**	**20**
Minimum	**145**	**19**
Maximum	**255**	**50**
Std. Deviation	25.589	5.523
Skewness	-.151	4.199

From table 4.9, the minimum and maximum SDLRS scores were 145 and 255 respectively with a standard deviation of 25.589 for the 36 second year students.

TABLE 4.10 DESCRIPTIVE STATISTICS FOR THE THIRD YEAR GROUP

	SDLRS SCORE	AGE IN YEARS
N	46	46
Range	79	22
Mean	**203.54**	**23.43**
Median	**204**	**22**
Mode	**204**	**21**
Minimum	**160**	**20**
Maximum	**239**	**42**
Std. Deviation	21.302	4.485
Skewness	-.088	3.045

From table 4.10, the minimum and maximum SDLRS scores were 160 and 239 respectively with a standard deviation of 21.302 for the 46 third year students.

When examining the results presented in tables 4.8 to 4.10 the lowest SDRLS score of 145 was observed in the second year group (see table 4.9) and highest score of 267 was observed in the first year group (see table 4.8). The average (mean) score for first, second and third year students were 217.94, 204.22 and 203.54 respectively (see tables 4.8, 4.9 and 4.10). The mean scores for the first year group fell within the average range (202-226). Further, the mean scores for the first year students were above the adult norm scores (214) see 4.2.4. On the other hand, the second and third year groups' mean SDLRS scores also fell within the average range, but both were below the mean score of 214 for adult mean scores. What these results entail was addressed in more detail under the discussion of the results (see 4.4.2).

4.3.1.2 Relationship between the Self-Directed Learning Readiness Scale and age

It is often desirable to know how one variable is related to the other (Cavana, Delahaye and Sekaran, 2000). The Pearson correlation coefficient provides a quantification of the strength of the relationship between two variables. In this study, it was of interest to determine the strength of the relationship between SDLRS and age (see table 4.11).

TABLE 4.11 SELF-DIRECTED LEARNING READINESS SCALE SCORE VERSUS AGE

		AGE IN YEARS	SDLRS SCORE
AGE IN YEARS	Pearson Correlation	1	.073
	Sig. (2-tailed)	.	.403
	N	133	133
SDLRS SCORE	Pearson Correlation	.073	1
	Sig. (2-tailed)	.403	.
	N	133	133

The correlation between the SDLRS scores and age was equal to 0.073. This figure, 0.073 was not significantly different from 0 since the p-value (0.403) was greater than 0.05. According to Cavana, Delahaye and Sekaran (2000) a zero value means that there is no relationship between the first (SDLRS score) and second completions (age). Therefore there is no significant correlation between the SDLRS scores and age as illustrated in table 4.11.

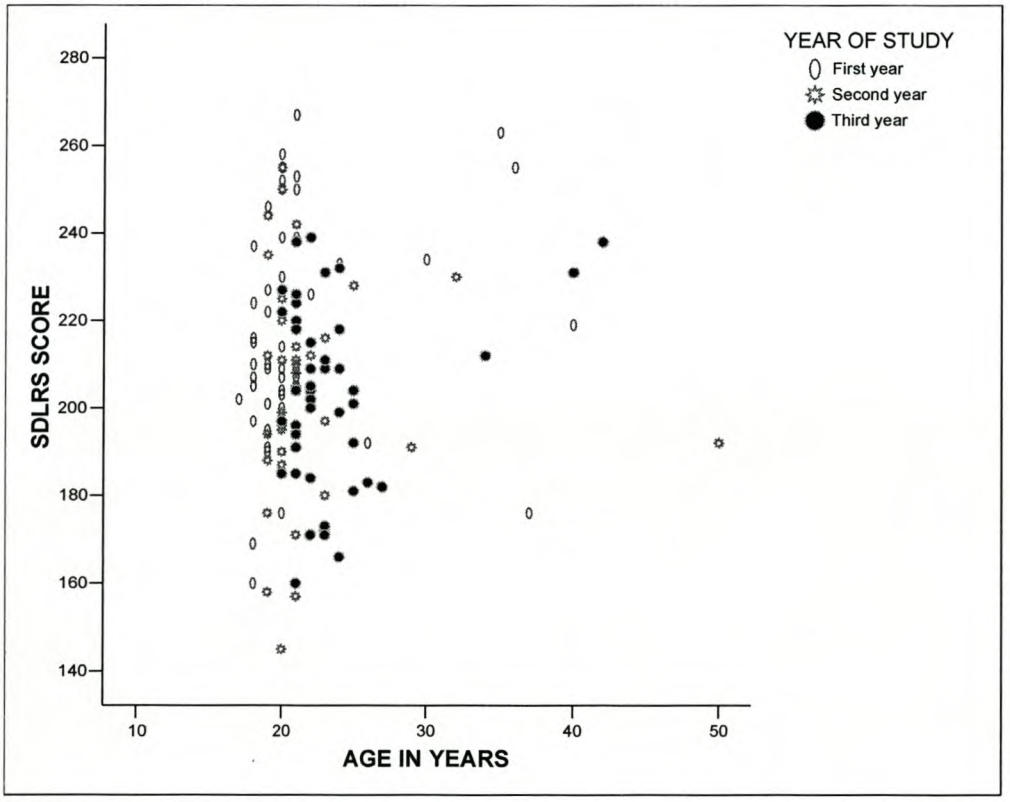

FIGURE 4.1: SCATTER DIAGRAM SDLRS VERSUS AGE FOR FIRST, SECOND AND THIRD YEAR STUDENTS

The scatter diagram depicted in figure 1 indicated that there is no correlation between the SDLRS and age in all the groups.

4.3.1.3 Normality tests

Normality tests were done on data to ensure that all data was of normal distribution before statistical analysis. A sig-value of less than 0.05 is referred to as being significant. The Kolmogorov-Smirnov and the Shapiro-Wilk tests were done.

TABLE 4.12 TEST OF NORMALITY: GENDER

	GENDER	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
SDLRS SCORE	Female	.041	87	.200(*)	.993	87	.913
	Male	.123	46	.079	.977	46	.483

* This is a lower bound of the true significance.
a Lilliefors Significance Correction

The SDLRS scores can be assumed normally distributed for both males and females. The significance value or p-value is greater than 0.05.

TABLE 4.13 TEST OF NORMALITY: YEAR OF STUDY

	YEAR OF STUDY	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
SDLRS SCORE	First year	.115	51	.091	.976	51	.395
	Second year	.084	36	.200(*)	.983	36	.829
	Third year	.069	46	.200(*)	.973	46	.345

* This is a lower bound of the true significance.
a Lilliefors Significance Correction

From table 4.13, the SDLRS scores can be assumed normal for first, second and third year students. The significant value or p-value is greater than 0.05. If normality could not be assumed, the Mann Witney U test would be used. They are included as confirmation that the data was normally distributed.

TABLE 4.14 MANN WHITNEY U TEST: RANKS

	GENDER	N	Mean Rank	Sum of Ranks
SDLRS SCORE	Female	87	64.24	5588.50
	Male	46	72.23	3322.50
	Total	133		

TABLE 4.15 TEST STATISTICS (a)

	SDLRS SCORE
Mann-Whitney U	1760.500
Wilcoxon W	5588.500
Z	-1.138
Asymp. Sig. (2-tailed)	.255

a Grouping Variable: GENDER

No significant difference between of males and females in terms of median SDLRS scores.

TABLE 4.16 KRUSKAL-WALLIS TEST: RANKS

	YEAR OF STUDY	N	Mean Rank
SDLRS SCORE	First year	51	79.50
	Second year	36	60.35
	Third year	46	58.35
	Total	133	

TABLE 4.17 TEST STATISTICS (a, b)

	SCORE: SDLRS SCORE
Chi-Square	8.760
df	2
Asymp. Sig.	.013

a Kruskal Wallis Test
b Grouping Variable: YEAR OF STUDY

There is a significant difference between at least one of the year groups and at least one other in terms of median SDLRS score. The Kruskal-Wallis test was used to confirm this. The one sample Kolmogorov-Smirnov test below was done to test whether the SDLRS score was normally distributed for the groups combined before further statistical analysis.

TABLE 4.18 ONE-SAMPLE KOLMOGOROV-SMIRNOV TEST

		SDLRS SCORE
N		133
Normal Parameters	Mean	209.25
	Std. Deviation	24.755
Most Extreme Differences	Absolute	.065
	Positive	.065
	Negative	-.038
Kolmogorov-Smirnov Z		.747
Asymp. Sig. (2-tailed)		.632

The SDLRS scores were normally distributed (calculated from the data) therefore the analysis of the t-test for gender and analysis of variance (ANOVA) can be used to determine if the groups differ significantly. The ANOVA is for year of study.

4.3.1.4 T-test

The t-test was done in order to test whether there were significant differences between females and males in relation to the SDLRS scores in the whole sample. The differences in means between the two gender groups (females and males) were evaluated using the t-test. The t-test is the most appropriate statistical test for the purpose of providing information on the whether the difference between two groups is significant or not. The t-test was presented in tables 4.19 and table 4.20.

TABLE 4.19 GROUP STATISTICS: DESCRIPTIVES

			N	Mean	Std. Deviation	Std. Error Mean
SDLRS SCORE	GENDER	Male	46	212.83	23.100	3.406
		Female	87	207.36	25.512	2.735

Table 4.19, represents the descriptive statistics for the two variables (males and females). The means for 46 males and 87 females were 212.83 and 207.36 respectively. On average these results indicated that males scored higher on the SDLRS as compared to females. However, such a result required confirming whether this was due to chance alone, or whether males were actually better self-directed as compared to females in the sample. From table 4.19, the standard deviations for males and females were about the same.

The Levene's test for equality of variances, yielded a p-value of 0.448, indicating that the variances are not significantly different. According to Cavana, Delahaye and Sekaran (2000), if the variances were significantly different, then the calculated p-value would be less than 0.05. Therefore the t-test in table 4.20 was calculated based on the results in table 4.19. According to Denscombe (1998), when using the t-test, the null hypothesis is taken as the starting point. With the null hypothesis, it is presumed that there is no real difference until proven by a statistical test like the t-test that there is a strong likelihood that any differences found between two sets of data were the result of something other than pure chance.

TABLE 4.20 INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
SDLRS SCORE	Equal variances assumed	.579	.448	1.214	131	.227

The independent samples' t- test was used to compare averages (means) of the two groups of data, males and females in this study. Table 4.20 gives the results of this analysis. The significance level or p-value represented by Sig, was found to be 0.227. If this value was less than 0.05 then Ho should be rejected and this should indicate a significant deference. Since the p-value of 0,227 was more than 0.05, the females and males do not differ significantly with respect to SDLRS scores.

4.3.1.5 One-way ANOVA (analysis of variance)

Having established the relationship between gender and the SDLRS scores as well as age and the SDLRS scores, the next step was to establish the relationship between the group levels and the SDLRS scores, which was the backdrop of this study. The one-way analysis of variance was used to examine the differences in mean SDLRS scores of the three levels of the Radiography Diploma at the TWR. The one-way ANOVA test analyses the variations within and between groups or categories of data using a comparison of means (Denscombe, 1998:203). The one-way ANOVA was used to establish whether the differences in the means between the SDLRS scores of three groups were statistically different from one another. In table 4.21, the SPSS generated the descriptive statistics for the three groups tested (first, second and third year students) as a starting point.

TABLE 4.21 DESCRIPTIVE STATISTICS

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
First year	51	217.94	25.016	3.503	210.91	224.98	160	267
Second year	36	204.22	25.589	4.265	195.56	212.88	145	255
Third year	46	203.54	21.302	3.141	197.22	209.87	160	239
Total	133	209.25	24.755	2.147	205.00	213.49	145	267

In table 4.21, the average responses of the first, second and third year students were 217.94, 204.22 and 203.54 respectively. As revealed in table 4.21, the highest average SDLRS score was observed in the first year group of students when compared with the second and third year group of students. The significance levels for the result were calculated. However, before obtaining the results of the ANOVA, a test of homogeneity of variances was done. The results of ANOVA show whether or not the means of the various groups are significantly different from one another, and this was indicated by the F statistics (see table 4.23). According to Cavana, Delahaye and Sekaran (2000:431) the F statistic is the ratio of the variance between groups divided by the variance within groups. The null hypothesis testing procedure was once more used. It was formulated as follows:

Ho: The average SDLRS scores of students in each group are equal.
Ha: The average SDLRS score of students in the groups differ.

TABLE 4.22 TEST OF HOMOGENEITY OF VARIANCES

Levene's Statistic	df1	df2	Sig.
.648	2	130	.525

TABLE 4.23 ANALYSIS OF VARIENCE (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6260.353	2	3130.177	5.453	.005
Within Groups	74628.459	130	574.065		
Total	80888.812	132			

The results of ANOVA show whether or not the means of the various groups are significantly different from one another and this was indicated by the F statistics (see table 4.23). In table 4.23 the F statistics was 5.454. According to Cavana, Delahaye and Sekaran, (2000:430) the greater the likelihood of between group variance compared with within-group variance, the greater the probability that the means of the groups will be different. The significance level was set at 5% (0.05). The null hypothesis would be rejected if the p-value (significance level) for the mean differences in the SDLRS scores were less than 0.05. The p-value in table 4.23 is less than 0.05 (0.005) therefore the Ho was rejected. Based on this, the conclusion arrived at was that the means of the three groups (first, second and third year students) differed significantly with respect to the SDLRS scores.

4.3.1.6 Post Hoc Tests

Post Hoc test are normally done after the ANOVA tests. These tests supplement the ANOVA tests in order to determine where differences lie if there are more than two groups. The ANOVA revealed that the means of the three groups differed significant with respect to the SDLRS scores. The Post Hoc Tests were therefore done in order to determine exactly between which of the three groups were. The Post Hoc Tests results are presented in table 4.24.

TABLE 4.24 MULTIPLE COMPARISONS DEPENDENT VARIABLES: SELF-DIRECTED LEARNING READINESS SCALE SCORES

					Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
								Lower Bound	Upper Bound
Scheffe	(I) YEAR OF STUDY	First year	(J) YEAR OF STUDY	First year					
				Second year	13.72	5.216	.034	.80	26.63
				Third year	14.40	4.872	.015	2.33	26.46
		Second year	(J) YEAR OF STUDY	First year	-13.72	5.216	.034	-26.63	-.80
				Second year					
				Third year	.68	5.332	.992	-12.52	13.88
		Third year	(J) YEAR OF STUDY	First year	-14.40	4.872	.015	-26.46	-2.33
				Second year	-.68	5.332	.992	-13.88	12.52
				Third year					
Dunnett T3	(I) YEAR OF STUDY	First year	(J) YEAR OF STUDY	First year					
				Second year	13.72	5.519	.045	.25	27.19
				Third year	14.40	4.705	.009	2.97	25.83
		Second year	(J) YEAR OF STUDY	First year	-13.72	5.519	.045	-27.19	-.25
				Second year					
				Third year	.68	5.297	.999	-12.28	13.63
		Third year	(J) YEAR OF STUDY	First year	-14.40	4.705	.009	-25.83	-2.97
				Second year	-.68	5.297	.999	-13.63	12.28
				Third year					

From the multiple comparisons in table 4.24, a sig-value (p-value) of less than 0.05 is seen as significant. When looking at the Scheffe's comparisons, firstly, the second and the third year groups' sig-values were 0.034 and 0.015 respectively when comparing these two groups with the first year

group. Secondly, the first and the third year groups' sig-values were 0.034 and 0.992 respectively when comparing these two groups with the second year group and thirdly, first and second year groups' sig-values were 0.015 and 0.992 respectively when comparing these groups with the third year group. Further, in the same table, the Dunnett's multiple comparisons revealed the same trend. Based on these results, it is apparent that the difference between the first and the two other groups (second and third) is significant while the second and third year groups did not differ significantly from one another. Therefore, the first year group significantly differed from the second and third year groups.

4.3.1.7 Homogeneous subsets

TABLE 4.25 SELF-DIRECTED LEARNING READINESS SCALE SCORES

			N	Subset for alpha = .05	
				1	2
Scheffe	YEAR OF STUDY	Third year	46	203.54	
		Second year	36	204.22	
		First year	51		217.94
		Sig.		.991	1.000

In table 4.25, the means for groups in the homogeneous subsets were displayed. The first year group had a significantly larger SDLRS mean (217.94) than the second and third year groups, 204.22 and 203.54 respectively. On the other hand second and third year groups did not differ significantly.

4.3.1.8 Cross tabulations (crosstabs)

Crosstabs are used to assess the relationship between two categorical variables (Alreck and Settle, 1985). In this study the variables were the year of study and the SDLRS scores that has been catagorised into three levels (table 4.26). The SDLRS scores were cross tabulated with the below average, average, above average and high for the sake of assessing the number and percentages of the students who fell under the mentioned categories of each year of study. The chi-squared test was used to assess the relationship. Alreck and Settle (1985: 344) advocate that the more the two variables are related to one another, the larger the chi-square value will be.

TABLE 4.26 YEAR OF STUDY VERSUS SELF-DIRECTED LEARNING READINESS SCALE SCORES

			SDLRS SCORE				Total
			Below average	Average	Above average	High	
YEAR OF STUDY	First year	Count	11	22	11	7	51
		% within YEAR OF STUDY	21.6%	43.1%	21.6%	13.7%	100.0%
	Second year	Count	17	12	6	1	36
		% within YEAR OF STUDY	47.2%	33.3%	16.7%	2.8%	100.0%
	Third year	Count	21	17	8		46
		% within YEAR OF STUDY	45.7%	37.0%	17.4%		100.0%
Total		Count	49	51	25	8	133
		% within YEAR OF STUDY	36.8%	38.3%	18.8%	6.0%	100.0%

Cross tabulations (table 4.26) of the year of study versus the SDLRS scores revealed that 43.1% of the first year group rated average with regard to their self-directedness as compared to their second and third year counterparts whose average ranges were 33.3% and 37.0% respectively. Also from table 4.26 in the above average to high SDLRS scores ranges, there were more first year students as compared to the second and third year students. There were 35.3% first year students within the above average to high ranges as compared to 19.5%and 17.4% in second and third year students respectively.

4.3.1.9 Chi-squared test

The chi-squared test was done to establish whether the observed pattern was by chance or not.

TABLE 4.27 CHI-SQUARED TEST

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.594	6	.024

The chi-squared test output resulted in table 4.27, revealing that there seems to be a significant relationship between year of study and the SDLRS scores.

4.4 SUMMARY OF RESULTS.

The purpose of the study was to establish the level at which Radiography Diploma students registered at the TWR for the year 2003 were ready to engage in SDL. Data collected from respondents was presented in tables and charts.

4.4.1 Emerging findings from the results

The following findings emerged from the results and are summarized below:

- Age by itself did not have a significant relationship with self-directed readiness (see table 4.11 and figures 4.3-4.5).
- Gender by itself did not significantly relate to self-directed readiness, that is high SDLRS scores (see table 4.19).
- The individuals who scored higher on the SDLRS were mostly those from the first year group.
- Individuals who scored lower on the SDLRS were mostly from the third year group.

Based on these findings, one can conclude that, those students who scored high were likely to be able to plan and direct the majority of their self-directed projects by themselves as compared to students who scored lower in SDLRS scores. These summaries, and what they mean based on the literature, were discussed in the coming sections of this chapter.

4.4.2 Discussion of results

This study was motivated by an interest in exploring the level at which students registered for the National Diploma Radiography: Diagnostics at the TWR were ready to engage in SDL. Radiographers are part of the health care team. In order to advance professional competence and prevent obsolescence, lifelong learning is essential behavior for active practitioners of a profession (Dixon, undated). Therefore it is important that radiography students are prepared to be lifelong learners in order to cope with the demands of the workplace and have the skills (SDL among others) necessary to engage in practices of continuing education and other professional demands after graduation. According to McFarlane and Dunlap (2000) there is a positive relationship between lifelong learning and self-directed learning. To take the lifelong learning concept further, Fischer and Scharff (1998)

advocate that the major objective of lifelong learning is to reduce the gap between school and the workplace learning because, when learning becomes a part of life, support for SDL is a necessity.

4.4.2.1 The relationship between gender or age and the Self-Directed Readiness Learning Scale scores

In this research, age and gender were requested from learners when completing the SDLRS in order to provide an insight about SDL learning and the two variables. From the results, there was no direct relationship between the SDLRS scores and gender or age. These results further support the results reported by Guglielmino, Guglielmino and Choy (2000) who found no significant relationship between the SDLRS scores and gender or age. It was important and significant to understand the role played by these two variables in self-directed learning in this study.

4.4.2.2 The relationship between the Self-Directed Learning Readiness Scale scores and the class levels

The main purpose of this study was to establish the level at which students are ready to engage in SDL in the Radiography Diploma programme at the TWR. By establishing the level at which students are self-directed, informed decisions of whether to implement SDL into the Radiography Diploma programme can be made. What emerged from the research was that a relationship between class levels and the SDLRS scores existed. It appeared that in first year, more students were self-directed as compared to the number of students in second and third years (see table 4.25). To explain this further, (table 4.25), 78.4% first year students' scores were within the ranges of average to high, 52.8% of the second year students' scores were within the ranges of average to high and 54.4% third year students' scores were within the ranges of average to above average with none in the high range.

The results of this study appeared to be contradictory. First year mean scores were higher (SDLRS mean score of 217) than second year mean scores (SDLRS mean score of 204) and third year mean scores (SDLRS mean score of 203). This result is contrary to the assumption that the readiness to engage in SDL increases as the level of education is increased. Further, research findings presented in (chapter 2, 2.8) were in agreement in that students are inclined to be more self-directed as the educational years increase. In this study, the third year students were the highest level in the programme and had more experience and understanding of the programme as compared to the first and second year students. Nonetheless, the researcher is of the opinion that the findings of this study indicate that there were other factors apart from the class level that influenced the results of this study. Herbeson (1991:196) asserts that factors other than the level of formal education are more important in

determining a learner's readiness for self-directed learning. The following paragraphs attempted to explain the findings.

In the year (2003) that the research was conducted, the first and second year students were introduced to a programme of continuous assessment and the principles of outcomes based education. There were no end of the year examinations for the first and second year students. On the other hand, the third year students had end of the year examinations. The assessment practices adopted for the first and the second year students included assignments, posters, journals, oral presentations, case studies and tests. These assessment practices involve students finding information on their own. Such assessment practices (in which students look for information on their own) have been associated with SDL. The fact that the first year group had the highest percentage of students ready to engage in SDL was possibly attributed to fact that the first year group was introduced to continuous assessments from the beginning of their training.

On the other hand, the lower percentage of third year students ready to engage in SDL could be attributed to the fact that the third year students had end-of year examinations to write and were therefore preoccupied with passing examinations and completing the programme. The third year group was adopting a surface approach to learning and this might have influenced their responses to the SDLRS questionnaires. A surface approach to learning is associated with learning for examinations (see 2.8). They understood learning in terms of memorizing what was possibly to be included in the examinations. The end-of year examinations, might explain the lower percentage of third year students ready to engage in SDL when compared to the percentage of students in the first year group (see table 4.26).

The percentage of second year students ready to engage in SDL was lower than that of the first year students. One would have expected second year students to have a higher percentage of students ready to engage in SDL when compared to the percentage of students that were ready to embark in SDL in the first year group. This was also contrary to the fact that second year students were senior students and should prefer to be self-directed than first year students who were new to the programme. This is based on the assumption that as the educational level increases, students tend to learn towards SDL as a preferred learning strategy. The researcher is of the opinion that assessments also influenced the results. Second year students were "the middle of the road participants". In their first year, the second year students wrote end-of year examinations. In their second year, another form of assessment programme was introduced without end-of year examinations. Therefore one can assert that second

year students were not sure at that stage what was better for them in terms of either continuous assessments or the traditional end-of year examinations. The results of this study provided some additional and vital information in that, the type of assessment practices adopted could influence students' willingness and perceived capacity to engage in SDL. Further, by switching from one assessment practice to another, some consideration should be made to the learning strategies adopted by the students in response to the changes in assessment practices (see 2.8).

Past experiences have also been linked to the propensity to be self-directed. For the purposes of this study, past experiences might be categorized as prior exposure to SDL practices, OBE, self-study, interactive learning technologies and possibly distance education just to mention a few. It is possible that students who have been exposed to the above-mentioned past experiences in learning, can display the willingness and perceived capacity to engage in SDL. One of the characteristics of OBE is the learner being accountable for performance to complete the learning programme, which is one of the cornerstones of SDL strategies.

The third year group was neither exposed to SDL nor OBE strategies at the TWR. The same can be said about the second year group who were not exposed to SDL or OBE strategies in their first year but only in the second year. From 2003, most of the study guides were OBE compliant in line with the Department of Radiography (TWR) requirements, in preparation for full implementation in 2005. The first year group was introduced to SDL and OBE principles from the beginning of their study at the TWR. Further, the first year group had students who matriculated in 2002 and those students were exposed to OBE principles. The Council of Education Ministers agreed to phase in OBE in General Education and Training (GET) and Further Education and Training (FET) bands in 2002 (Education and Training Update, 2001). It is therefore possible that the first year group's average SDLRS score was higher than the other groups due to their prior exposure to SDL principles.

In summary, it does appear from the SDLRS mean scores that the first year group was more self-directed as compared to the other group of students. However, the researcher has cited the possible reasons for the discrepancy as a way of understanding the results. The most important finding of this study suggests that the first year group was ready to engage in SDL as such they should be introduced to SDL teaching and learning strategies.

4.5 PREVIEW OF THE FINAL CHAPTER

Chapter 5 will conclude the study. The summary and recommendations are covered in the final chapter. The final chapter drew to a close what was initiated in the opening chapter of this study.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The results, their meaning and implications for the Department of Radiography students, lecturers and the TWR are highlighted and discussed in this chapter. Conclusions are made with a view to making a contribution to the implementation of SDL in the National Diploma Radiography: Diagnostics at the TWR or any institution offering the programme. The chapter finally ends with directions for future research.

5.1 REVIEW OF THE STUDY AND RESULTS

The purpose of the study was to investigate the level at which most National Diploma Radiography: Diagnostics students at the TWR were ready to engage in SDL. To achieve this, comparisons of the SDLRS mean scores among the first, second and third year students were made in order to establish the students' readiness for SDL. The students who participated in the study were all registered for the National Diploma Radiography: Diagnostics in 2003.

The instrument used to gather information about the readiness of the students to engage in SDL was the SDLRS. This has been widely used as a tool for basic research designed primarily to explore the link between learner self-directedness and a wide range of variables (Brockett and Hiemstra, 1991). The SDLRS is a measure of the degree to which individuals perceive themselves to possess skills and attitudes associated with SDL. The appropriateness for opting to utilise the SDLRS for this study was discussed in chapter 3.

Some valuable information emerged from the literature review that is useful in the conceptualisation of SDL as a teaching and learning strategy and issues that pertain to the implementation and effectiveness of SDL. However the literature review provided no guidance for institutions of HE to determine readiness for SDL specific to the radiography field. Nonetheless the researcher is of the opinion that the information gathered in the literature review and the results of this study provided some guidance to the radiography programme at the TWR and to those wishing to engage in SDL practices.

Evidence gathered in this study suggested that SDL has the potential of being implemented in the National Diploma Radiography: Diagnostics. By taking a closer look at each group of students, the percentage of students in the lower ranges (58-176) for first, second and third year students was lower than the percentage of students between average and high on the SDLRS, an indication that most of the students were capable of engaging in self-directed learning (table 4.26). According to table 4.26, 36.8% of the students, all groups combined, were below average regarding their SDL readiness as compared to 63% of students from average to high who indicated the readiness for SDL.

When one considers changing the status qua (teacher-led instruction to learner-led strategies) one needs to explore, understand and develop strategies for the alternate before embracing it. Hence the literature searches for factors that could influence the adoption of SDL. Possible factors that could influence the implementation of SDL in the radiography diagnostics programme in this study are covered in the preceding paragraphs.

5.2 CONCLUSIONS

The implications of the findings in this study are important to the Department of Radiography; the TWR and other institutions offering the National Diploma Radiography: Diagnostics; the Professional Board for Radiography and Clinical Technology which is responsible for registration of radiographers, accreditation of training institutions, the custodian of the CPD activities; students at the TWR and any advocates of SDL. The results of this research revealed that the first year group was ready to engage in SDL as compared to the other groups. Further 36.8% of the all participants were below average, 38.3% were average, 18.8% were above average and 6% were high (table 4.26). The study adds up to the number of studies that suggest that adult students are ready to engage in SDL although their level of SDL readiness differs. Furthermore the researcher hopes that this study will initiate dialogue and build on future research about SDL in the radiography profession.

Finally, the results from this study have major implications for the future training of diagnostic radiographers at the TWR and possibly at other institutions offering the programme. As diagnostic radiographers are expected to keep abreast of the advances in their profession, it seems reasonable that they have to be ready to be self-directed. The study should open up dialogue about SDL in the education and training of diagnostic radiographers in view of the fact that continuing education is mandatory in the profession, and therefore there is an urgent need for continual learners. SDL can play a major role in shaping diagnostic radiography teaching and learning in the direction for lifelong

learning. When properly planned and implemented, SDL is an educational strategy that can enable radiographers to function fully to their potential. They will be able to advance in professional competences. The use of computers, internet and multimedia tools will not threaten graduating radiographers because they will be in a position of facing the challenges of the world of work and be ready to learn all times if the need arises.

5.3 IMPLICATIONS AND RECOMMENDATIONS

The fact that the SDLRS mean scores for the first year students were relatively higher than those of the second and third year students indicated the importance of this study. The results were influenced by two major factors, namely assessment practices and past experiences of the students (previous learning and teaching strategies).

The change from the teacher-directed to SDL teaching and learning strategies requires a common understanding on the part of the students, educators acting as facilitators and the institution (management or administrators of the institution). This is in view of the fact that some students and educators might find the shift from teacher-directed to SDL an exciting experience, on the other hand some might find the shift to the new roles and responsibilities difficult to engage. The institution itself can also resist the change for the simple reason that change brings with it disruption to the "business as usual" way of doing things. Nonetheless, having established the readiness of students and the advantages and feasibility of engaging in SDL, any concerns relating to the implementation of this teaching and learning strategy should be addressed without fail.

The results highlight the need to scrutinise and consider assessment practices before adopting SDL. Furthermore, a number of guidelines for the students, educators and the institutions can be identified in order to facilitate the implementing and managing of SDL in the radiography programme at the TWR and other training institutions training radiographers. These are discussed in the following sections.

5.3.1 The implications for students

Students tend to be reluctant to adopt new ways of learning because they are likely to prefer the tried and tested methods of teaching and learning where the teacher is the provider of information and they the recipients of that knowledge. Nonetheless, the reluctance to engage in SDL can be overcome if new ways of learning are introduced gradually, allowing students the opportunity of having both forms of

learning without having to choose between them. In this way students gain an additional learning strategy.

As stated in the literature review, students need to be afforded the opportunity to be part of their own learning. Such an opportunity might not seem beneficial to some, especially based on past experiences of learning. The ability to be a self-directed learner carries with it expectations and responsibilities. Students need to know the goals for SDL for them to appreciate the benefits of this teaching and learning strategy. The diagnostic radiography students should be given the opportunity to take charge of their own learning because the results of this study suggest that the majority of students are ready to be self-directed in their learning. Students who scored lower in the SDLRS should be given the opportunity to learn the skills required to be effective self-directed learners.

5.3.2 The implications for lecturers in the Department of Radiography

An opportunity to sensitize the students to SDL may present itself during orientation week. During this period, students can be informed about SDL, its successes, research done on SDL with regard to readiness of first year students and the benefits of SDL. At this stage, the readiness of "new comer" students can be assessed so that those who demonstrate readiness to SDL can be given the opportunity to pursue the skills for SDL (for example, they should be engaged in learning projects). Learning projects are associated with SDL because the students search for information themselves. It is important that those students who demonstrate SDL skills should not be drawn back to teacher-led learning strategies but should be "lead" straight into SDL teaching and learning strategies. Students who score low on the SDLRS should be afforded the opportunity to slowly transcend into the SDL teaching and learning strategy.

Educators (lecturers) are considered central to any change efforts by an institution because they are the arbiters of what does or does not get implemented in the classroom. The diagnostic lecturers should adopt a workable way of teaching and learning in the classrooms level. The role of the lecturers with regard to SDL will not only be confined to ensuring that students master content, but also to assume the role of assisting students to take control of their own learning (the learning process). Lecturers should have a fair understanding of what SDL and its dynamics are. In that way they will be able to foster the skills for SDL in order to produce self-directed learners. Furthermore, lecturers need to understand what motivates students to learn. In chapter 2, it was stated that with SDL, educators act as facilitators. Therefore it is crucial that the lecturers assume facilitation roles and play an important role in the

development of learners towards SDL strategies. In that way, one instills the attributes of self worth and confidence in students, which in turn fosters the need to be self-directed. Lecturers should take cognisance of the fact that even the highly self-directed learner is not totally autonomous in the sense that the learner needs no interaction or collaborate with others, but might require some kind of teacher and peer interaction. The lecturer should have an understanding that not all students are ready to engage in SDL. Therefore provision should be made for SDL to co-exist with teacher-led strategies until the transition to SDL is achieved at all levels.

5.3.3 The implications for the institution

The recognition of institutions in the workplace is influenced by the caliber of students that graduate from them. Openness to the wider contexts of higher education is always a starting point for institutions engaged in higher education that are preparing to embrace new challenges and formulations. Accepting and embracing SDL as a new strategy for teaching and learning, brings with it, important outcomes because the diagnostic radiography students graduating from the institution (TWR) will be ready to embrace the challenges of the workplace with confidence and openness to continual learning. The change to SDL requires that attention be given to the understanding of the strengths and weaknesses of teacher-led strategies so that new teaching and learning strategy (SDL) can be approached with a view to supersede the weaknesses of teacher-led strategies. In that way, opportunities that SDL creates for students and graduates alike are identified and a commitment to the change on the part of the institution is achieved. The institution (TWR) should set up policy frameworks, interpret the fundamental values, which underlie SDL teaching and learning in line with what the institution is about (mission) based on what SDL can achieve.

For SDL to succeed, the institution should direct and set up resources and infrastructure conducive to SDL and all stakeholders in order to provide best practices for SDL. The institution should lead in embracing SDL and then devolve it down to the lecturers and then students. The buying into SDL by the institution should be accompanied by a sufficiently flexible and robust adaptation of SDL in order for it to reach acceptable levels without it being viewed as a teaching and learning strategy that is being forced on educators and students who might still be in favour of teacher-led strategies.

The institution, which is regarded as the custodian of the teaching and learning that takes place, the facilitators who act as change agents or arbiters of teaching and learning and the students who are

customers, should support change in institutions. Such partnerships cannot be overlooked or undermined for SDL to succeed.

5.3.4 Implementing self-directed learning in the Department of Radiography at TWR

The results of this study revealed that there were considerable numbers of students who were willing, and perceived themselves to be, self-directed. Therefore, it is imperative to provide opportunities for the diagnostic radiography students to assume control of their own learning in order for them to be ready to meet the challenges of the world of work and lifelong learning. As stated in 4.4.2.2, percentages of the first, second and third year students, 78.4%, 52% and 54% respectively, scored between average and high (202-290) on the SDLRS. It was only in the third year group that no student scored within the high range (252-290). These results indicated that the implementation of SDL in the National Diploma Radiography: Diagnostics is feasible.

As mentioned earlier in this chapter, the implementation of SDL Department of Radiography at the TWR would require a buy in from the students, lecturers and the management. The three stakeholders should be involved from the beginning to the end of the implementation process.

- Management should take the leading role in policy formulation regarding the activities surrounding SDL.
- The lecturers would be involved with course content, and how it would be facilitated at class level. Teaching strategies used should promote SDL and discourage passive learning (teaching and students listening). Various SDL teaching and learning strategies can be applied. These are summarized below and were identified in 2.3 (strategies identified by Spencer and Jordan, 1999 as well as those identified by De Boer, 1994).
- Once the students' readiness to be self-directed is confirmed, lecturers should embrace SDL as an alternative teaching and learning strategy.

Apart from assigning students independent work (assignments, case studies and projects) which have been used in the Department of Radiography on a random and smaller scale among some of the group of students, small group work is perceived as affording students with SDL skills. Small group work provides students not only with the opportunity to develop and improve their social and communication skills but also with the opportunity to utilise their knowledge. Diagnostic radiographers interact with a

number of health care personnel at different levels including patients, therefore acquiring such a skill at an early stage of ones career (during training) will benefit the both the individual and the organization that the individual will be working for.

The students should be actively involved for SDL to be a reality. Their input would be vital in the selection of resources to be used in their own learning, some input in the evaluation methods and criteria and setting goals for completion of their own studies. To pursue the evaluation notion further, self-evaluation by students should be introduced and encouraged. Self-evaluation is an important part of effective SDL because the student identifies with it and eventually owns the knowledge gained.

Peer tutoring should be encouraged because it is a learner-centred approach to learning. In relation to SDL it will perceived by the peer tutor as empowering in terms of being responsible for the learning material. In this way, the peer tutor is taking charge of the learning process. Currently the peer tutor programme in the Department of Radiography is on hold. It would benefit both the department and students if it is revived as a way of implementing SDL.

Learning contracts are useful tools for initiating SDL and they serve as communication tools between learners and facilitators. A learning contract is a written plan that describes what an individual will learn as a result of some specified learning activity. It is a way to help learners structure their own learning. A learning contract typically consist of five major elements, namely, learning objectives, learning resources and strategies, target dates for completion, evidence of accomplishment and criteria and means for validating evidence. The use of learning contracts is important in the establishment of personal ownership of, and direction for learning. If used correctly, learning contracts can help in attending to the diversity of learner needs and at the same time instill a sense of responsibility towards own learning to the individual learner.

The researcher is of the opinion that implementing SDL in the Department of Radiography will be well received by lecturers as an alternative teaching and learning strategy that will equip their students with a skill that will make them "survive" in the world of work and professional advancements.

5.4 FUTURE DIRECTIONS

Apart from the fact that this study was limited in scope, and only used one institution in a single academic year, it produced some valuable results. This research focused on SDL in higher education with special reference to the readiness of National Diploma Radiography: Diagnostics students at the TWR to engage in SDL. Hopefully, this research will contribute to the continuing discussion regarding the importance of SDL as a viable teaching and learning strategy in higher education. Further, the results of this study should open dialogue and discussions in the Department of Radiography and other institutions offering the programme in South Africa. This dialogue should begin soon, in view of the fact that when learners matriculate after being exposed to OBE principles, to "take them back" to teacher-led instruction would be contradictory to what they would have been exposed to at school, and the way they should continue to learn in higher education.

There is a need to scrutinise other mechanisms underlying SDL implementation such as students' assessment practices and past experiences. These two mechanisms played a role in the readiness of the students in this study. Assessment practices should be in line with the aims of SDL, for example to foster deep learning and not surface learning. Therefore this is a challenge for future researchers to demonstrate the relationship between SDL and different assessment methods in the hope of identifying assessment methods suitable for SDL in the diagnostic radiography programme. This can bring about improvement in the implementation of "quality" SDL practices.

The role and influence of OBE should also be scrutinised in order to have a clear understanding of what its role is in SDL. Future research could take into account the impact of OBE on SDL by comparing the readiness of students entering the National Diploma Radiography: Diagnostics Radiography programme at different institutions. It is recommended that such a study would be more appropriate after 2006 when the first group of matriculants will be issued with OBE certificates. At that stage, it should be mandatory to use SDL teaching and learning strategies in order to harness the SDL principles that these students would have been exposed to at school. By harnessing the SDL principles, a meaningful learning experience that will last throughout the working life of individuals can be achieved.

Finally, educational institutions and educators should remember that SDL is a gradual educational strategy requiring a framework onto which students gradually transcend their own experiences, as they become self-directed and lifelong learners. There is no documentation available about diagnostic

radiographers' readiness for SDL although their work continually calls for "self-directed decisions" and continuous learning. If diagnostic radiographers are to function on their own, it seems reasonable that they will feel ready for independent learning throughout their lives, which is in line with continuing professional development (CPD) principles. As stated (see 1.2) radiographers are expected to accumulate CPD points over a period of time to maintain registration with HPCSA. It is therefore the responsibility of the training institution, and in this instance the TWR, to ensure that the students that are sent out into the world of work are responsible owners and managers of any work experiences they may encounter.

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APPENDIX 1

PROFESSIONAL BOARD FOR RADIOGRAPHY AND CLINICAL TECHNOLOGY
HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA

P O Box 205
Pretoria
0001

553 Vermeulen Street
Arcadia
Pretoria

☎ (012) 338-9300
FAX (012) 328-4862

e-mail: daniek@hpcsa.co.za
Website http://www.hpcsa.co.za

DEPT: PROFESSIONAL BOARDS: GROUP B
SENIOR MANAGER: J H COETZER

TO ALL REGISTERED PRACTITIONERS

My Ref: 22/6/1/6
Mr D J Kotzé
8 May 2002

Dear Sir/Madam

CONTINUING PROFESSIONAL DEVELOPMENT

The Professional Board recently resolved that in view of the provision in Section 26 of the Health Professions Act, 1974 (Act 56 of 1974) for Continuing Education and Training as a pre-requisite for continued registration, a compulsory system of Continuing Professional Development for all practitioners registered under the auspices of the Professional Board be implemented with effect from 1 April 2002.

The Education Committee of the Professional Board will control the CPD activities of the Professional Board. A practitioner will be required to accumulate 20 points per year (10 points in the case of supplementary diagnostic radiographers and restricted supplementary diagnostic radiographers) in order to retain his/her registration.

For your information I attach hereto the following documents:

Guidelines for Continuing Professional Development
Rules relating to continuing professional development in Radiography and Clinical Technology (Board Notice 36 of 2002)
Form CPD 3 – DR-KT Point allocation for CPD activities
Form CPD 4 – DR-KT Criteria and guidelines for approval of CPD activities
Form CPD 1 – DR-KT (CPD portfolio) – Only to be submitted at the end of the first year.

Please note that application forms for approval of CPD activities should not be submitted to the Professional Board. Providers of CPD activities will analyse activities in terms of the guidelines, allocate points and retain the application forms for future reference.

Educational Institutions will be informed of their function and role as CPD providers in the administration of CPD points accumulated in respect of such activities.

Points accumulated during the period 1 April 2001 to 31 March 2002 could be reflected in the CPD Portfolio to be submitted to the CPD Officer by 30 April 2003.

I trust that you will find the CPD programme an enriching experience which would further develop your skills in serving the public at large and in managing CPD as part of your personal career development.

Yours sincerely

.....
for MR H J HUMAN
CHAIRPERSON: EDUCATION COMMITTEE OF THE PROFESSIONAL BOARD

APPENDIX 2

SDLRS

Name_____ Sex_____ Birthdate_____

Date of Testing_____ Location of Testing_____

LEARNING PREFERENCE ASSESSMENT

Instructions This is a questionnaire designed to gather data on learning preferences and attitudes towards learning. After reading each item, please indicate the degree to which you feel that statement is true of you. Please read each choice carefully and circle the number of the response which best expresses your feeling.

There is no time limit for the questionnaire. Try not to spend too much time on any one item, however. Your first reaction to the question will usually be the most accurate.

ITEMS:	RESPONSES				
	Almost never true of me: I hardly ever feel this way.	Not often true of me; I feel this way less than half the time	Sometimes true of me; I feel this way about half the time.	Usually true of me; I feel this way more than half the time.	Almost always true of me: there are very few times when I don't feel this way.
1. I'm looking forward to learning as long as I'm living.	1	2	3	4	5
2. I know what I want to learn.	1	2	3	4	5
3. When I see something that I don't understand, I stay away from it.	1	2	3	4	5
4. If there is something I want to learn, I can figure out a way to learn it.	1	2	3	4	5
5. I love to learn.	1	2	3	4	5
6. It takes me a while to get started on new projects.	1	2	3	4	5
7. In a classroom, I expect the teacher to tell all class members exactly what to do at all times.	1	2	3	4	5
8. I believe that thinking about who you are, where you are, and where you are going should be a major part of every person's education.	1	2	3	4	5
9. I don't work very well on my own.	1	2	3	4	5

		Almost never true of me; I hardly ever feel this way.	Not often true of me; I feel this way less than half the time	Sometimes true of me; I feel this way about half the time.	Usually true of me; I feel this way more than half the time.	Almost always true of me: there are very few times when I don't feel this way.
10.	If I discover a need for information that I don't have I know where to go to get it.	1	2	3	4	5
11.	I can learn things on my own better than most people.	1	2	3	4	5
12.	Even if I have a great idea I can't seem to develop a plan for making it work.	1	2	3	4	5
13.	In a learning experience, I prefer to take part in deciding what will be learned and how.	1	2	3	4	5
14.	Difficult study doesn't bother me if I'm interested in something.	1	2	3	4	5
15.	No one but me is truly responsible for what I learn.	1	2	3	4	5
16.	I can tell whether I'm learning something well or not.	1	2	3	4	5
17.	There are so many things I want to learn that I wish that there were more hours in a day.	1	2	3	4	5
18.	If there is something I have decided to learn, I can find time for it, no matter how busy I am.	1	2	3	4	5
19.	Understanding what I read is a problem for me.	1	2	3	4	5
20.	If I don't learn, it's not my fault.	1	2	3	4	5
21.	I know when I need to learn more about something.	1	2	3	4	5
22.	If I can understand something well enough to get a good grade on a test, it doesn't bother me if I still have questions about it.'	1	2	3	4	5
23.	I think libraries are boring places.	1	2	3	4	5
24.	The people I admire most are always learning new things.	1	2	3	4	5

		Almost never true of me; I hardly ever feel this way.	Not often true of me; I feel this way less than half the time	Sometimes true of me; I feel this way about half the time.	Usually true of me; I feel this way more than half the time.	Almost always true of me: there are very few times when I don't feel this way.
25.	I can think of many different ways to learn about a new topic.	1	2	3	4	5
26.	I try to relate what I am learning to my long-term goals.	1	2	3	4	5
27.	I am capable of learning for myself almost anything I might need to know.	1	2	3	4	5
28.	I really enjoy tracking down the answer to a question.	1	2	3	4	5
29.	I don't like dealing with questions where there is not one right answer.	1	2	3	4	5
30.	I have a lot of curiosity about things.	1	2	3	4	5
31.	I'll be glad when I'm finished learning.	1	2	3	4	5
32.	I'm not as interested in learning as some other people seem to be.	1	2	3	4	5
33.	I don't have any problem with basic study skills.	1	2	3	4	5
34.	I like to try new things, even if I'm not sure how they will turn out.	1	2	3	4	5
35.	I don't like it when people who really know what they're doing point out mistakes that I am making.	1	2	3	4	5
36.	I'm good at thinking of unusual ways to do things.	1	2	3	4	5
37.	I like to think about the future.	1	2	3	4	5
38.	I'm better than most people are at trying to find out the things I need to know.	1	2	3	4	5
39.	I think of problems as challenges, not stopsigns.	1	2	3	4	5
40.	I can make myself do what I think I should.	1	2	3	4	5

		Almost never true of me; I hardly ever feel this way.	Not often true of me; I feel this way less than half the time	Sometimes true of me; I feel this way about half the time.	Usually true of me; I feel this way more than half the the time.	Almost always true of me: there are very few times when I don't feel this way.
41.	I'm happy with the way I investigate problems.	1	2	3	4	5
42.	I become a leader in group learning situations.	1	2	3	4	5
43.	I enjoy discussing ideas.	1	2	3	4	5
44.	I don't like challenging learning situations.	1	2	3	4	5
45.	I have a strong desire to learn new things.	1	2	3	4	5
46.	The more I learn, the more exciting the world becomes.	1	2	3	4	5
47.	Learning is fun.	1	2	3	4	5
48.	It's better to stick with the learning methods that we know will work instead of always trying new ones.	1	2	3	4	5
49.	I want to learn more so that I can keep growing as a person.	1	2	3	4	5
50.	I am responsible for my learning — no one else is.	1	2	3	4	5
51.	Learning how to learn is important to me.	1	2	3	4	5
52.	I will never be too old to learn new things.	1	2	3	4	5
53.	Constant learning is a bore.	1	2	3	4	5
54.	Learning is a tool for life.	1	2	3	4	5
55.	I learn several new things on my own each year.	1	2	3	4	5
56.	Learning doesn't make any difference in my life.	1	2	3	4	5
57.	I am an effective learner in the classroom and on my own.	1	2	3	4	5
58.	Learners are leaders.	1	2	3	4	5

APPENDIX 3

Department of Radiography

Memorandum

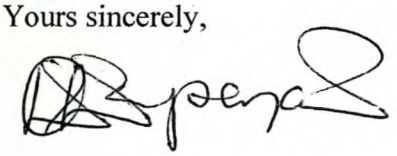
To : The Vice Chancellor Academic
From : Ms Chipeya
Date : 26 June 2003
Subject : Request to Administer the Self-Directed Learning Readiness Scale to Radiography diploma students.

My name is Lucky Chipeya a lecturer in the department of Radiography. I am a registered student at the University of Stellenbosch completing a research thesis for MPhil in Higher Education. I wish to request permission to administer the Self-Directed Learning Readiness Scale to the first, second and third year students currently registered for the Radiography diploma at this Technikon. The title of my topic is: An assessment of readiness for self-directed learning of National Diploma Radiography: Diagnostics students at the TWR.

I hope the results obtained from this study will provide valuable information in the teaching and learning strategies practised in this and other institutions offering programme.

I hope my request will be put under your most favourable consideration.

Yours sincerely,



Ms Chipeya
Lecturer and Nuclear Medicine Course Coordinator:
Department of Radiography.

APPENDIX 4

Guglielmino & Associates

Thank you for your recent inquiry about the SELF-DIRECTED LEARNING READINESS SCALE (SDLRS).

The SDLRS is designed to measure the complex of attitudes, abilities, and characteristics which comprise readiness to engage in self-directed learning. It is a self-report instrument which was developed by Dr. Lucy M. Guglielmino while at the University of Georgia. Fourteen authorities in the area of self-directed learning participated in a Delphi study to identify the characteristics which the SDLRS is designed to measure.

The SDLRS has been used by more than 500 major organizations around the world. More than 40,000 adults and 5,000 children have taken the SELF-DIRECTED LEARNING READINESS SCALE, and more than 70 doctoral dissertations have been completed using the SDLRS. The adult form of the instrument has been translated into Spanish, French, German, Italian, Korean, Chinese, Japanese, Finnish, Greek, Portuguese, Afrikaans, and Lithuanian.

The following forms of the SDLRS are now available:

*SDLRS-A	FOR THE GENERAL ADULT POPULATION (58 items)	$4.95 each
*SDLRS-ABE	FOR ADULTS WITH LOW READING LEVELS OR NON-NATIVE ENGLISH SPEAKERS (34 items)	$4.95 each
*SDLRS-E	FOR CHILDREN (58 items)	$4.95 each
SDLRS-S	The Learning Preference Assessment: A self-scoring version of the SDLRS-A for immediate feedback.	$5.95 each

FOR BUSINESS USE OF THE LEARNING PREFERENCE ASSESSMENT, CALL (800) 633-4533 TO ORDER FROM HRDQ.

*Scoring and a printout of descriptive statistics for your sample are included in the price when ordering more than 50 copies. Shipping is extra. Volume discounts for educational institutions and students for these forms are as follows:

100-200	$3.95 each
201-500	$3.50 each
over 500	$3.25 each

Advanced statistical analysis of your SDLRS data is available if desired. Please call for an estimate of the cost.

Sincerely,

Lucy M. Guglielmino

Lucy M. Guglielmino, Ed.D.
Paul J. Guglielmino, Ed.D.

ADDRESS AS OF MAY 2002:
7339 Reserve Creek Drive
Port St. Lucie, FL 34986

734 Marble Way, Boca Raton, FL 33432 • /FAX: (772)429-2423
E-mail: lguglielmino@rocketmail.com • Website: http://www.guglielmino734.com

APPENDIX 5

Guglielmino & Associates

SDLRS Administration

Do not inform respondents of the name or the exact purpose of the SDLRS. This is necessary to avoid possible response bias. Use the description of the instrument which is included in the instructions printed on the SDLRS.

Be sure that the respondents understand the configuration of the **BLUE** answer sheet. Then review with them the marking instructions printed on side 2:

- **Use a #2 pencil.**
- **DO NOT use ink or ballpoint pens.**
- **Make heavy black marks that fill the circles completely.**
- **Erase cleanly any answer you wish to change.**
- **Do not make any stray marks on the answer sheet.**

Allow the respondents as much time as they need to complete the SDLRS. Administration usually requires about 30 minutes. Answering vocabulary questions or reading the items for the respondents will not affect the validity of the scores.

SDLRS Score Report

Scoring of the SDLRS is included with all orders of 50 copies of the SDLRS or more. Our normal computer printout gives you the individual's name or ID, SDLRS score, sample mean, standard deviation, variance, range, standard error, kurtosis, minimum and maximum score, skewness, number of valid observations, and missing observations. This information will allow you to compare each individual score to the sample mean and to the adult norms.

You can request that the scores be printed alphabetically, from high to low, or sequentially by ID number. There is no extra charge for this service. If you require multiple scoring runs, there will be an additional charge to cover the cost (usually $50-75.00).

If you want to examine the data by sex, age, race or by any other demographic or correlate the SDLRS score with other scores or data, we are able to provide you with any statistical analysis you might want. Please call us for prices concerning this service.

Only return the **BLUE** answer sheets for scoring to our address below.

Thank you for using the SDLRS,

Lucy M. Guglielmino

Lucy M. Guglielmino, Ed. D.
Paul J. Guglielmino, Ed. D.

7339 Reserve Creek Drive, Port St. Lucie, FL 34986 •
Telephone: (772) 429-2425 • FAX: (772)429-2423
E-mail: lguglielmino@rocketmail.com • Website: http://www.guglielmino734.com